# WISDOM

THE MAGAZINE OF ENCYCLOPAEDIA BRITANNICA LEARNING AND EDUCATION

MOTION PICTURE INVENTOR THOMAS A. EDISON

IMITED EDITION

## WISDOM OF THE ENCYCLOPAEDIA BRITANNICA FILMS

AND MANY OTHER TIMELESS ARTICLES MAGNIFICENTLY ILLUSTRATED

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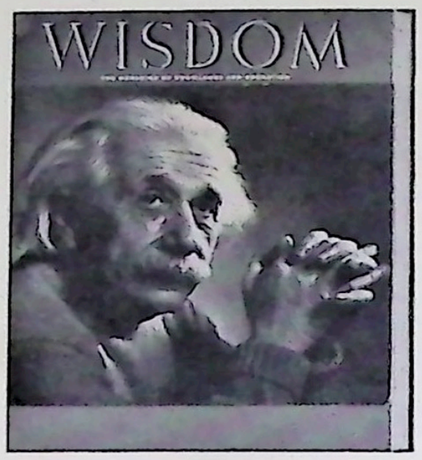

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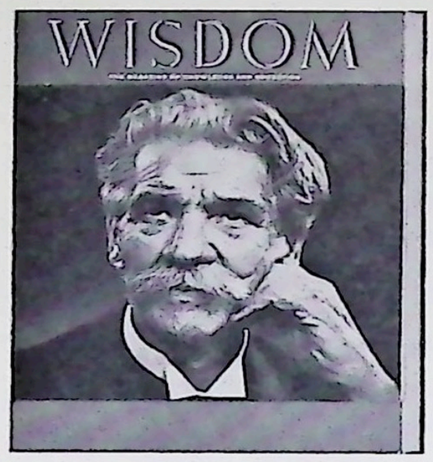

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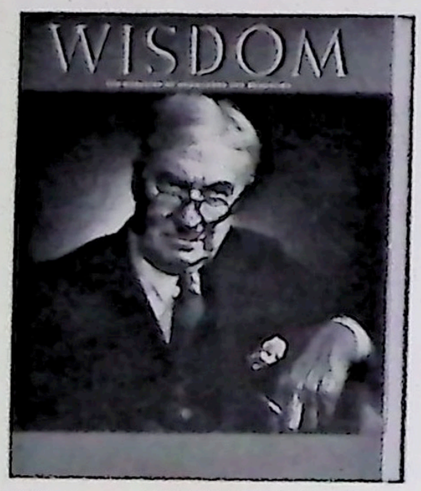

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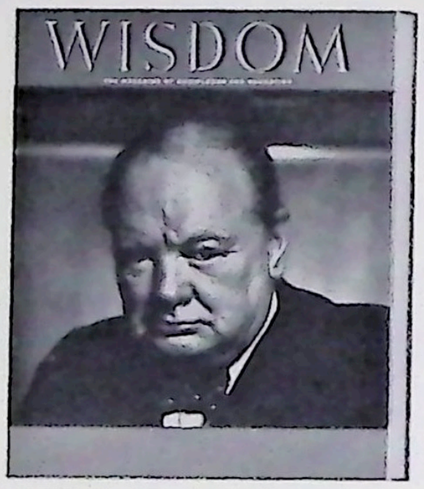

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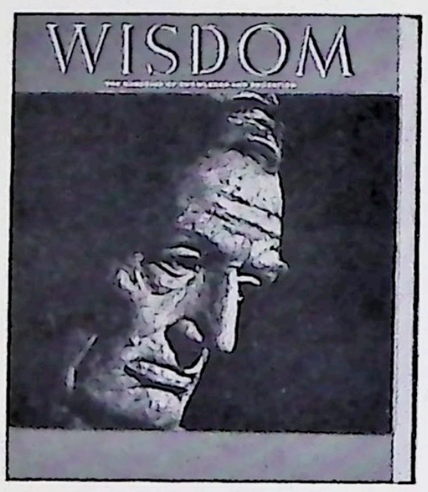

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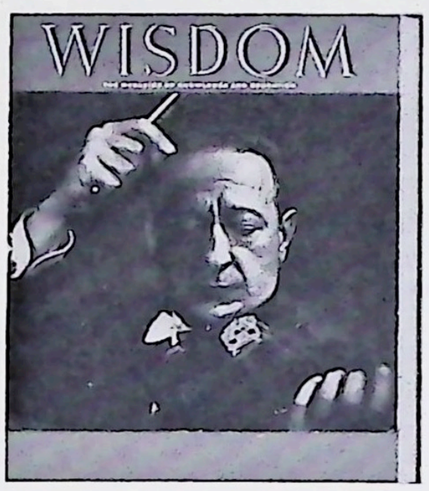

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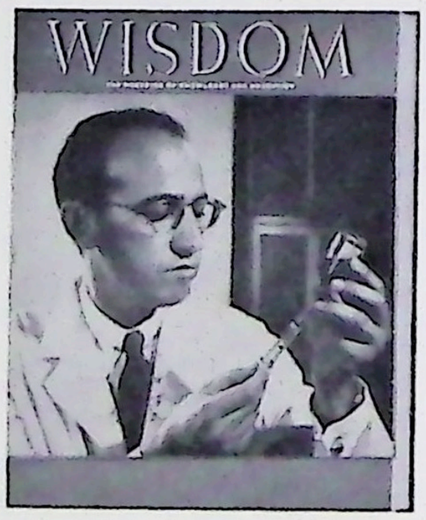

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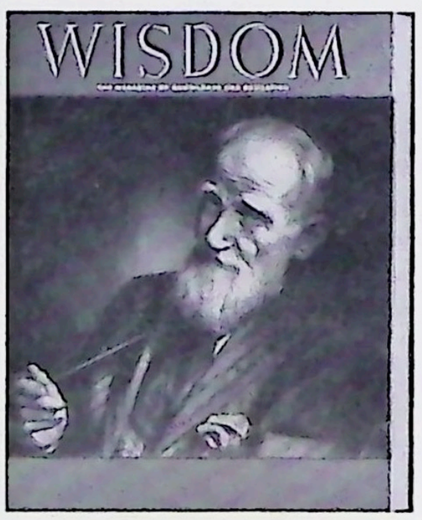

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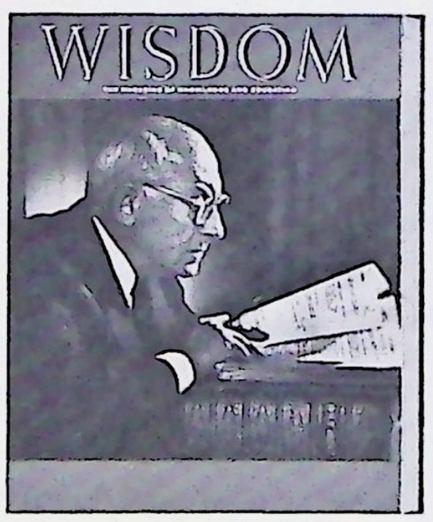

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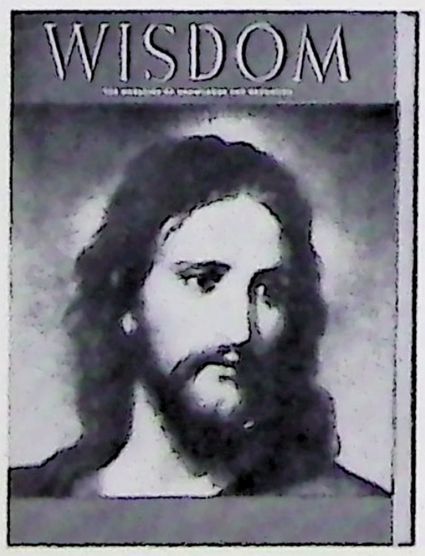

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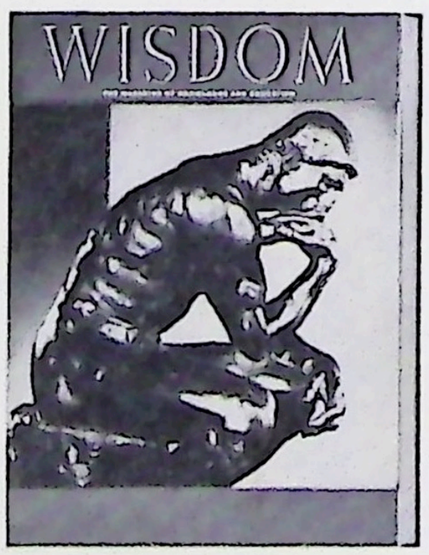

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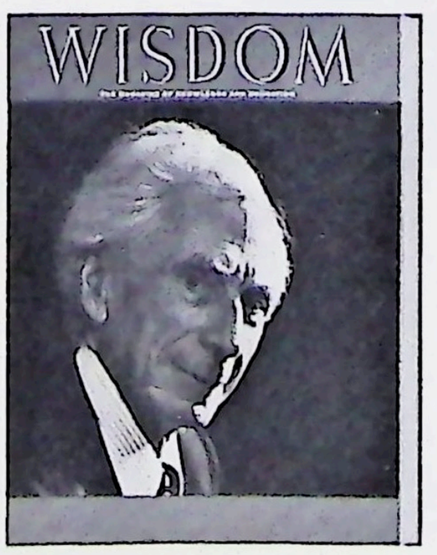

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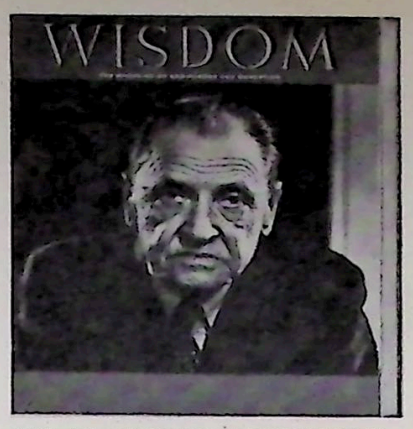


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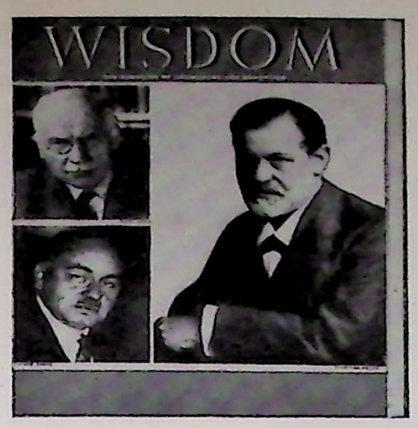


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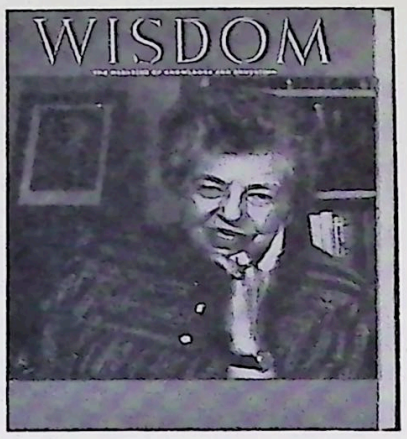


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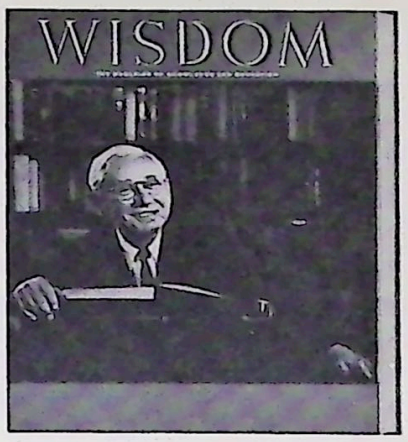


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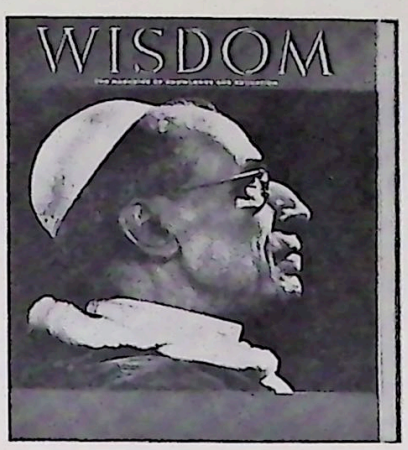


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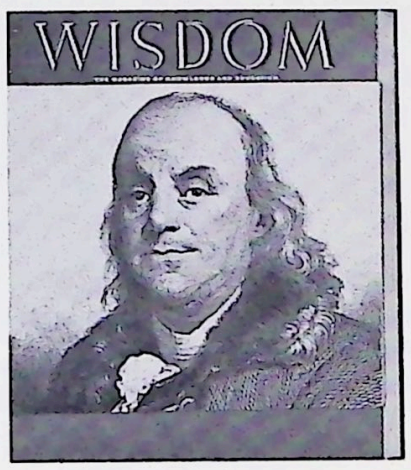


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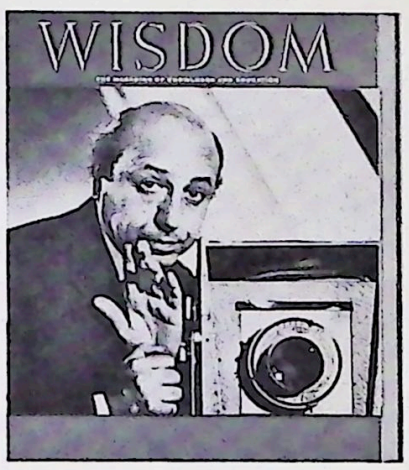


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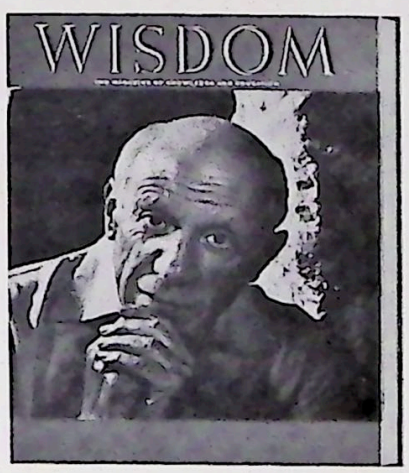


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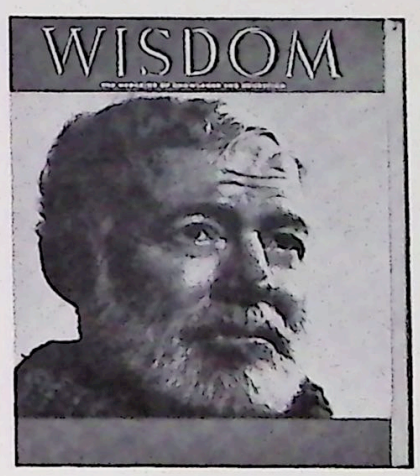


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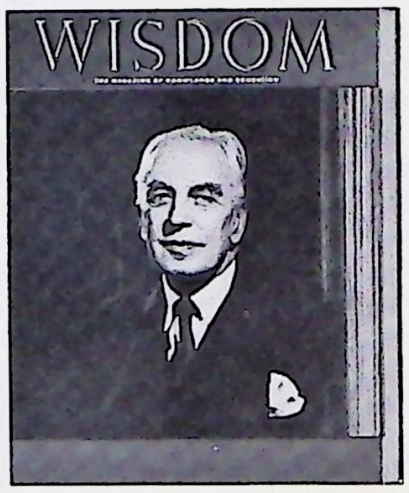


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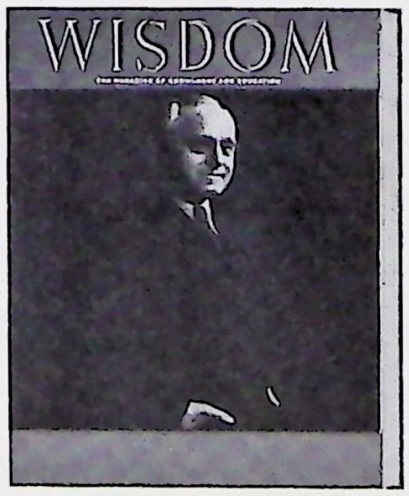


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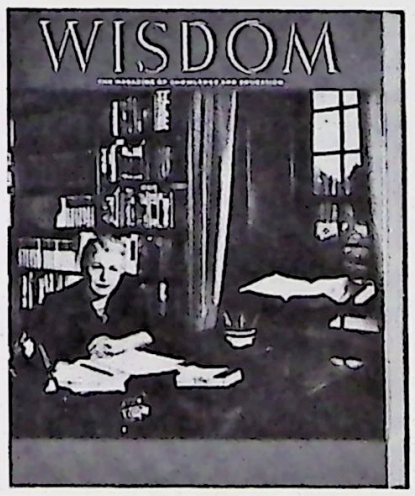


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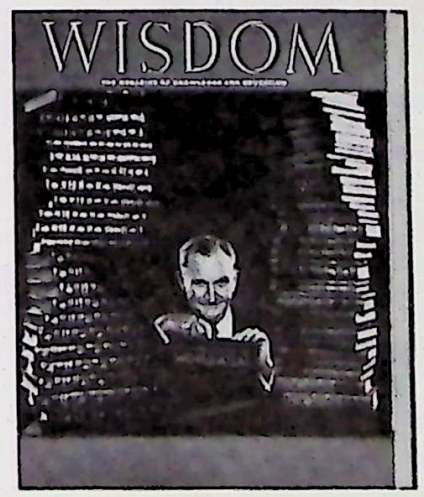


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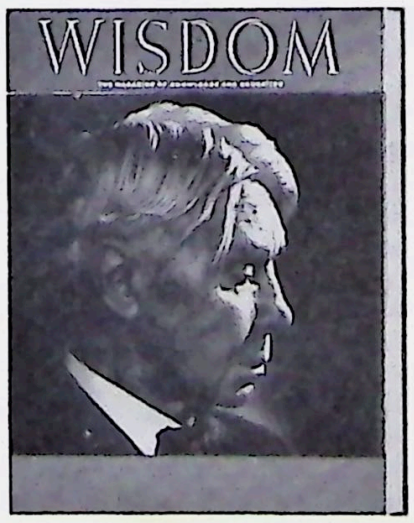


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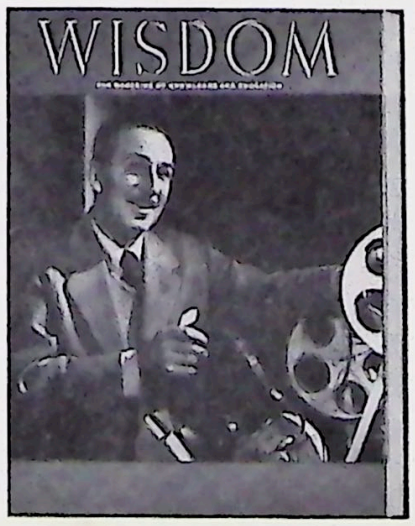


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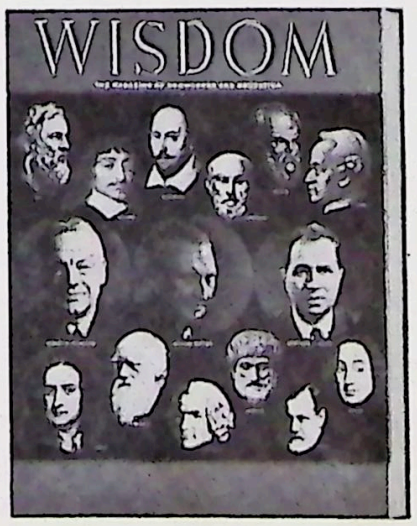


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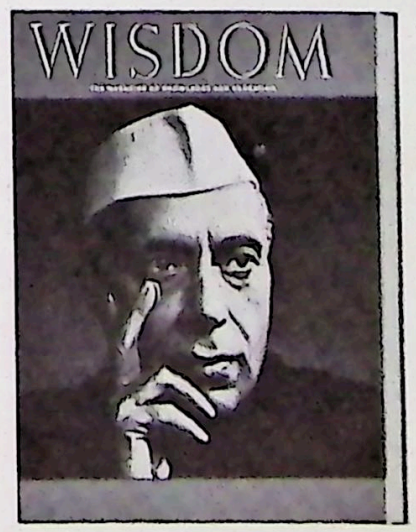


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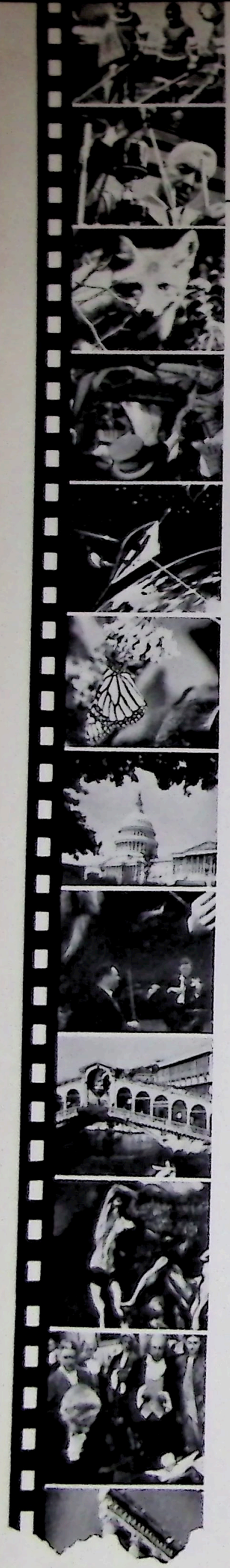

# WISDOM

**THE MAGAZINE OF KNOWLEDGE FOR LIFETIME LEARNING AND EDUCATION**

LEON GUTTERMAN
Editor and Publisher

**IN THIS VOLUME OF WISDOM:**

EDUCATION – A NEW ERA BEGINS
STORY OF ENCYCLOPAEDIA BRITANNICA FILMS
PRODUCING FILMS FOR TEACHING AND LEARNING
THE UNIQUE CONTRIBUTION – WHAT EVERY TEACHER SEEKS
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*November 1960*

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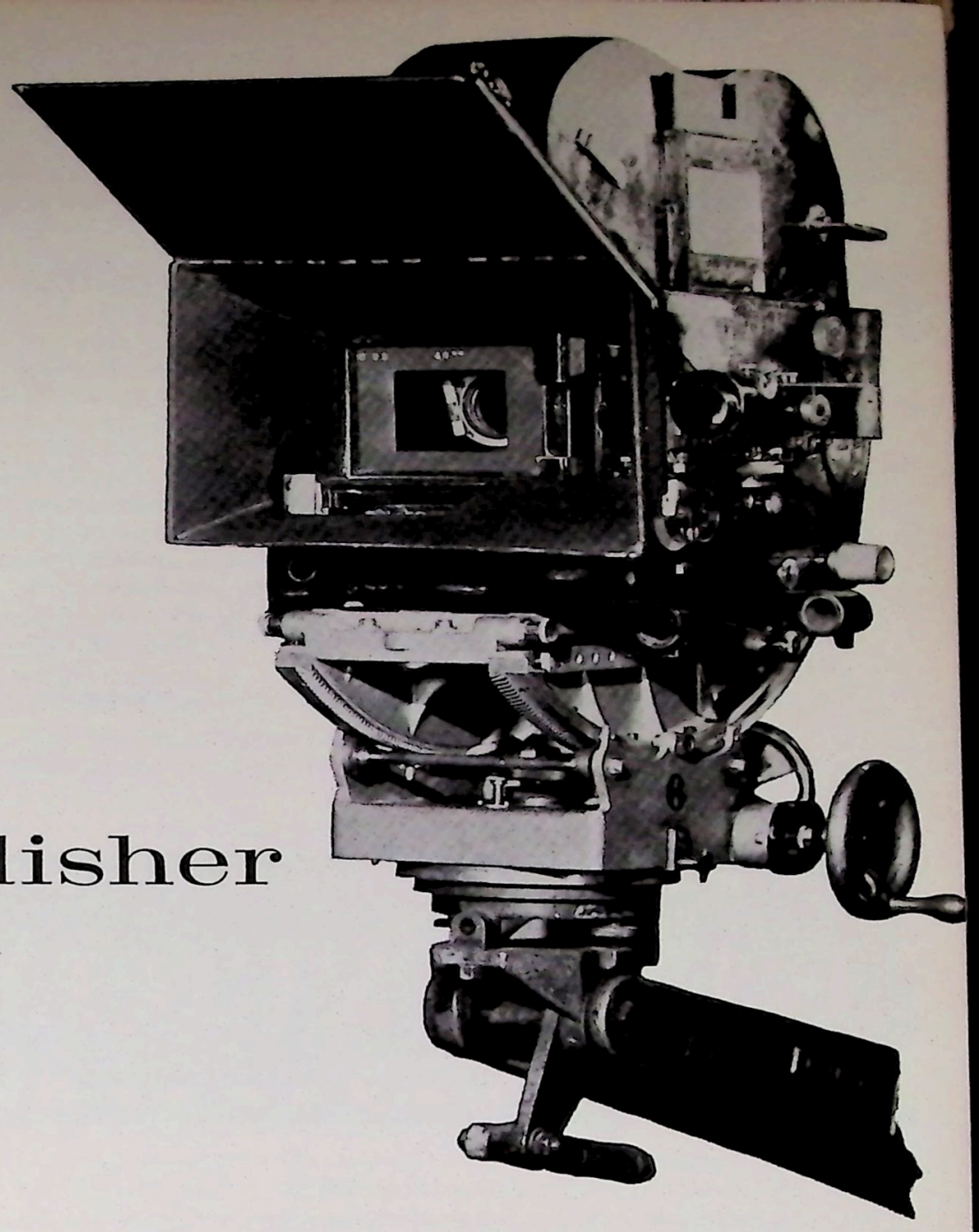
LEON GUTTERMAN, EDITOR AND PUBLISHER



# A Letter from the Publisher

WHAT a tremendous influence motion pictures have upon the minds, imagination and thoughts of people! They exert an influence which is immense and profound — an influence which transcends differences in language or custom, age or creed — for we are today a motion picture-minded people. Thus the influence of educational films for good cannot be overestimated. This influence inheres, first of all, in the mere mechanism of the motion pictures—the vividness of the impression which they make upon the observer. Of vast importance is the fact that the films operate primarily and fundamentally through the organs of vision, the most potent of our physical senses, and sight is the most important teaching medium. We remember not what we hear, nor even what we read, but primarily what we see. It is not too much to say that classroom films constitute altogether the most powerful educational influence that exists in the modern world.

The educational film is a great art which matches the classic achievements of literature, painting, poetry, architecture, sculpture and music. Encyclopaedia Britannica Films, the world's oldest, largest and most respected producer and distributor of educational motion pictures, produces teaching films which are as far removed from the theatrical tradition of the movies as they can possibly be. They reveal almost mystically the camera's capacity for seeing beyond mortal eye to the inner quality of things. The producers, directors and writers of these unique classroom films are intelligent men who make intelligent films and contend that theirs is essentially a medium for conveying information, ideas, knowledge — not something to amuse, to divert, to pass an idle hour. Their instructional films are something very important in modern civilization, for they have produced films that are not only good, but superb; not only interesting, but thrilling; not only instructive, but inspiring. They have extended the dimensions of learning. They have opened new horizons in education.

Creative genius of a high order generally goes into the making of an educational film, and what is produced on the screen by the creative intelligence of Encyclopaedia Britannica's film makers gladdens the understanding heart. These men have inquiring minds, minds which are seeking to enlarge the student's own understanding and comprehension, minds which are continually plunging into new fields, seeking new ideas and new knowledge, correlating, synthesizing, analyzing, ever seeking to satisfy an insatiable curiosity. They are, in other words, always in the process of enlarging man's knowledge and understanding.

Encyclopaedia Britannica films convey understanding, not just an array of facts. They convey ideas, not techniques. They interpret the world, not merely project its photograph. Films are the essence of creative thinking. Knowing and using the thoughts of others, films add something to them, reinterpret them, illuminate them, extend them, convey them in a meaningful way to others, using them to stimulate new thoughts, new ideas.

The educational film belongs to the people and mirrors their lives. It is one of the greatest weapons utilized for cultural and social advance. It has enlarged the world of human experience, setting up new images and enabling us to feel what we have known, and to know what we have felt. It gives concrete content to a word, either a new word or one which is known but not used. It gives life to a character or story. It portrays a setting for a story, an event, or a historical period. Films help the mind grasp the scope of time, and the relation to each other of events of history. The film is not only the revealer of the unknown world to man, but its grand interpreter. In revealing the essence of life it has given us the key that unlocks the profoundest mysteries of creation, the lens through which to look at the labyrinth of the universe. It unlocks for us the storehouses of the past and introduces us to the beauty that is around us, and helps us to explore and investigate the unknown frontiers of knowledge that lie beyond and outside us and our experience.

Education has become the major industry of twentieth century America. It is by far the biggest and most hopeful of the nation's enterprises. The more education a person has, the more he wants. Long ago our people recognized that education for all is not only democracy's obligation, but its necessity. Education is the foundation of democratic liberties, the key to world order. No thinking person doubts that we are living in a decisive moment of human history. The complexity of the present situation at best is baffling to all of us. We are faced with a changing, groping, unstable world — a world that is a battleground in the global struggle of ideas for the possession of the mind and spirit of man.

The educational motion picture is an outpost in this struggle of ideas. There is no way of keeping minds open save by keeping them in contact with ideas, ideas of yesterday, if these have shown by their survival that they are probably sound; but better still, ideas of today; and best of all, ideas of tomorrow. It takes a long time for ideas to get started; it takes much longer for ideas to get hold of people, and still very much longer for people to get hold of ideas.

We have a big job of education to do. Nothing less than a complete reorientation of our thinking will suffice if mankind is to survive and move on to higher levels of thought and action. It is this task in particular that challenges our educators, scholars, and our teachers to lead the way toward a new way of thinking. They must plan, with intelligence, imagination, courage and wisdom, the course we are to take toward the kind of tomorrow we want.

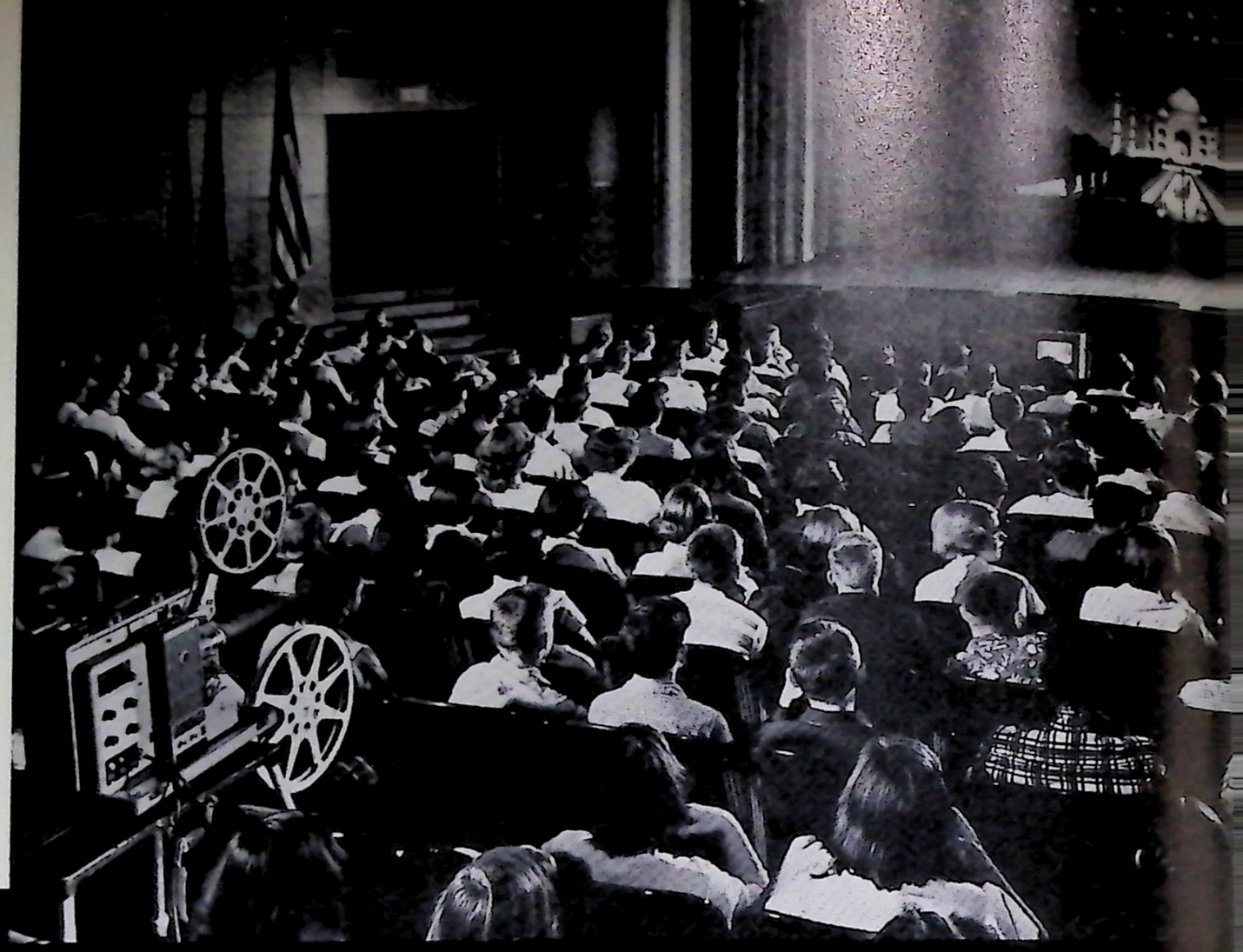
Leon Gutterman

*The explosion of knowledge—the almost unbelievable breakthroughs of science and technology—the menacing contest between democracy and communism—these forces mean that men must learn more and learn it faster. Our schools have a primary responsibility that can be discharged only if they are able to make full use of the new tools and skills of mass communication.*

WILLIAM BENTON, *Chairman of the Board, Encyclopaedia Britannica Films*

*Devotion to democratic principles cannot be mere unreasoned sentiment. It must be based on sound understanding of the issues and forces that have created present-day institutions. History and politics are human drama; yet the dry-as-dust pages of textbooks generally offer nothing but the fossils of them. Motion pictures and other visual media can bring this drama to life.*

ADLAI STEVENSON, *Chairman, Executive Committee, Encyclopaedia Britannica Films*



# EDUCATION—*A New Era Begins . . .*

*by Maurice B. Mitchell*
*President, Encyclopaedia Britannica Films*

ONE of the great revolutions of our times is the communications revolution. In education, it will change the classroom of tomorrow through the introduction of audio-visual techniques.

Man has always been equipped for audio-visual communication in its truest sense. From the beginning, he had eyes that could see the whole horizon of his primitive world. His ears could hear sounds, and his voice could be heard. He used these tools to learn the things he had to learn—to survive, to defend himself, to shelter himself and his family. He learned them by watching, by listening, by being told, and he taught them to his children. Man's need for communication then, as today, was measured in terms of his needs in education.

Man's world grew bigger. People across the river, on the other side of the mountain, were doing things his eyes couldn't see, making sounds his ears couldn't hear, and he could no longer speak to them. Knowledge existed without belonging to him; he possessed knowledge he could not communicate to others; he became, in a real sense, mute and deaf and blind. He fought to overcome these limitations. He built boats to cross rivers and subdued horses for transportation, but the world kept getting bigger and the horizons kept receding. Soon, he couldn't even send a man on horseback to get all the news, and the voice of the town crier didn't reach the outskirts of the community.

Frustrated by these limitations, he developed an alphabet which he put together to form words; a code, if you will. Those who could break the code and learn to read could communicate and begin to lift some of the limitations on learning.

Then came the printing press; it launched the first great communications revolution. Almost from that day to this, all of man's knowledge and philosophy, the things he has had to say and the things others have had to say to him, have been identified with the printing press. Our libraries have become the storehouses of learning. Our teachers taught the code of the printed word as the fundamental device for communication. Yet, pictures of distant peoples and places man could paint only in his mind's eye, and their sounds he could only imagine.

In the span of our own lifetime, man wrought another great communications revolution. He devised radio to throw his voice around the world, jumping the highest mountains and spanning the widest seas. He developed photography and the motion picture. Photography had come painfully on pieces of wet glass and tin, then on paper to preserve with the magic of the camera the sights which lay beyond the horizons of people's eyes. Man learned to make these sights move. He learned to match the sights with sounds he could record. Finally, he learned to throw both across the skies in a split second with the magic of television. Man had recovered the sight of his eyes, the use of his voice, and the hearing of his ears, to any horizons he cared to view. He opened the doors to a new era in education.

Some say that audio-visual education began in 1928 in the Paramount Theater in New York City. The theater darkened, and on the screen appeared Al Jolson singing *Mammy,* in the first sound picture ever made. This spectacle opened the way for educators, handicapped by apparently insoluble problems in communication and education.

One was verbalism—learning the *words* that describe something, but not their *meaning.* Another was finding a device for giving common experience to the people who sit in a classroom. Some come from homes of great cultural resources; some from families who traveled; some have parents with advanced education; some are from homes without these advantages, but perhaps with others. Against so mixed a background of experience, the teacher faces an almost insurmountable problem in communicating to different levels of perception. In films giving all students experiences in common, the teacher has found for the first time (not counting the field trip—slow, elaborate, and expensive) a device for establishing this precious uniform background.

Films make other unique contributions. We call it a unique contribution when a child in Cleveland can sit down in the home of a Chinese child, see what things look like at his dinner table, where his father works, what it is like in his kitchen when his mother prepares dinner, what his school is like, where he prays. We call it unique when we can turn the eyes of students back into time, time before any of us was living, and let them identify with great historic events.

The film maker offers unique contributions when he looks inside an apparently solid object with the magic of the X-ray camera and exposes its workings to eyes that could never have seen it that way; when he opens up a human body and takes the class into the circulatory system; when he lets the biology student sit inside a human heart and look out through the

valve while the heart is beating. Seen in an autopsy or in the *post-mortem* state, it is only a wrinkled piece of flesh, but a heart valve from inside the beating heart is a graceful, beautiful, functional thing.

To record a process which happens so fast no human eye can see it, with the magic of the high-speed camera, is a unique contribution. Time-lapse cameras record the five-week metamorphosis from caterpillar to butterfly, shrinking it to eleven minutes, compressing time to fit the classroom purpose. And what can be done to time can be done to space. A student who lives in the great Midwest can see what things look like on the West Coast or the East Coast, where he may never have been and may never go. In these unique ways, compressing many hours of labor and explanation, teachers use films to create meaningful experiences.

Our primary concept in the development of audio-visual techniques was to help teachers overcome old limitations. We have now gone far beyond that. Working with the National Academy of Sciences in response to the shortage of physics teachers, we recently completed and delivered to the schools an introductory course in physics for senior high school or freshmen college students. It is the first complete course in the American curriculum ever recorded entirely on sound motion picture film. The National Academy of Sciences told us the best qualified master teacher in the field of physics teaching was Harvey White of the University of California at Berkeley. Professor White had developed special skills in twenty years' teaching experience for the communication of difficult concepts of physics by visual techniques. Under merciless white-hot lights and remorseless stares of motion picture and television cameras for one hundred sixty-two consecutive days, he taught the classic course in introductory physics. With its two hundred thousand feet of film in the finished version, it may be the biggest single sound motion picture project ever undertaken.

When Harvey White had finished, he surveyed the films and submitted a list of four hundred and fifty mistakes he had made. We reshot, over many, many weeks, the four hundred and fifty individual scenes in which these mistakes had been made. Professor White observed that in his twenty years of teaching he had made most of those mistakes time and again and never realized it. So we gave one physics teacher a lavish rehearsal of the techniques he had used to teach and the learning he had taught.

Harvey White's course has been used in over six hundred American schools during the last three school years—often in classrooms with no teachers. Some had teachers whose preparation consisted of a single introductory course in college physics—or less.

Yet, from the very beginning, this first complete course in a beginning science proved its worth and indicated that a new era in education had arrived. Less than a year after Harvey White began teaching students and teachers from screens in classrooms across the nation, our camera crews were filming the beginning course in chemistry. With teacher John Baxter and a team of advisors from the American Chemical Society, a course in modern chemistry unequalled in effectiveness and up-to-date content was produced that soon soared to wide acceptance in leading American public schools.

And hardly had the work begun on the chemistry project than a third film project—this time in the humanities—was created. Here the Encyclopaedia Britannica Films pioneer production teams chose Clifton Fadiman, and Maynard Mack and Bernard Knox of Yale, to lead off a series of films for high school and college use, aimed at teaching the humanities—man's techniques of expression since time began—as they have not been taught before.

Here, in three short years, was the birth of a new and deeply significant era in audio-visual techniques. The film, always a useful and powerful *supplement,* was now also being produced as a *basic* teaching tool.

On every front, a revolution is taking place. We can impress the work of master teachers on film. We can distribute film, sound and picture, through the magic of television, closed circuit or public. We can use the projector in the classroom itself. We can reach every student. Yet this isn't good enough. We are still doing in the audio-visual field what education has always done—taking the leavings of American technological development. The television set in the classroom is at best an adaptation of the set in the living room. It is not designed for classroom use; it does not function ideally as a classroom instrument. The sound motion picture projector we use is a shrunken-down version of the big projector designed for motion picture theaters. It hasn't radically changed in the last quarter century. It is still a great fat, hot, wheezing device which terrifies most school teachers of either sex. We are still making motion pictures on the same delicate, fragile acetate we made them on in the beginning, with its precision-punched sprocket holes and the delicate layers of chemicals on the top. We put the film in the can and it shrinks and stretches and liquefies and does all sorts of strange and mysterious things. It is still hand-processed in some kind of witch's brew in a dark room. But there are great changes on the horizon.

The classroom of tomorrow, as it will be equipped for audio-visual education, will be set up so the room can be effectively darkened. It will have no projector; it will use no film. There will be a sheet of glass in the front of the room, a part of the blackboard, on which the instructor can write in chalk. Next to it will be the telephone dial, and from the dial will hang a telephone book, and in that book a catalog of every audio-visual device, film, and filmstrip that has been made. Then the instructor who has brought a class to the point where these communications devices can be usefully employed will go to the telephone book. He will look up the number of the film he wants, and dial it. The picture will appear instantly on the screen, flown through space by micro-wave relay to the saucer on the roof, and a stream of electrons will paint it on the screen. It is this kind of teaching tool the nation's teachers are asking for.

As always in education, we move slowly. We meet the resistance of those who either do not understand or do not choose to understand. When we launched the physics course on film, heated opposition came first from physicists and physics teachers who said, "What's going to be left for us to do?" Yet, of the many classrooms now using the films, those enjoying the greatest use are the ones where good physics teachers work. They have found freedoms—freedom from janitor work, from coming in at seven in the morning to rig cumbersome experimental set-ups, freedom from aspects of group instruction which have always weakened the impact of good teachers. A good teacher watches his class while it learns by film and singles out those gifted students or those slow students who need his special care.

These are many implications in the communications revolution for education. We are only at the starting line. Many things we have come to accept as routine in education will radically change. I would warn you they *are* changed behind the Iron Curtain.

Douglas Johnston of the London County Council, that civic board which runs the schools in the capital city of Great Britain, took a team of British teachers for a hard look at the schools behind the Iron Curtain. I recommend as interesting reading his description of an "average" Russian classroom in a school of over five hundred students. The teacher stands at the front of the room. In front of him is a control panel of switches. He darkens the room by remote control. He activates a projector threaded with films from his own private film library, assigned to his subject area and kept in his school building. He can start and stop the projector. He can run it back and start over. He can knock out the sound track and let a student narrate the film to demonstrate his understanding of the concepts. If he wishes, he can project, simultaneously on the same screen, filmstrips from a separate filmstrip projector. He also has an overhead projector. He plays these instruments like an organ. And, says Johnston, what they found in the science classrooms they found also in the geography and history classrooms.

There is tremendous use made of the tape recorder in the Soviet Union for the study of languages. I am told there are more than forty-three thousand teachers of English in the Soviet Union. I am further told that until recently only a handful of American institutions of higher learning taught Russian. Yet, I learn from scientists at the Massachusetts Institute of Technology that in less than ten years from today a student in the sciences who has Russian and English at his command will hold the key to eighty per cent of the scientific literature of his time. We have preserved too long the folklore that the Russians are moody, dumb peasants. There are those who see in the new communications devices the key to power and control and domination, for these are tools which come as easily to demagogues as to pedagogues.

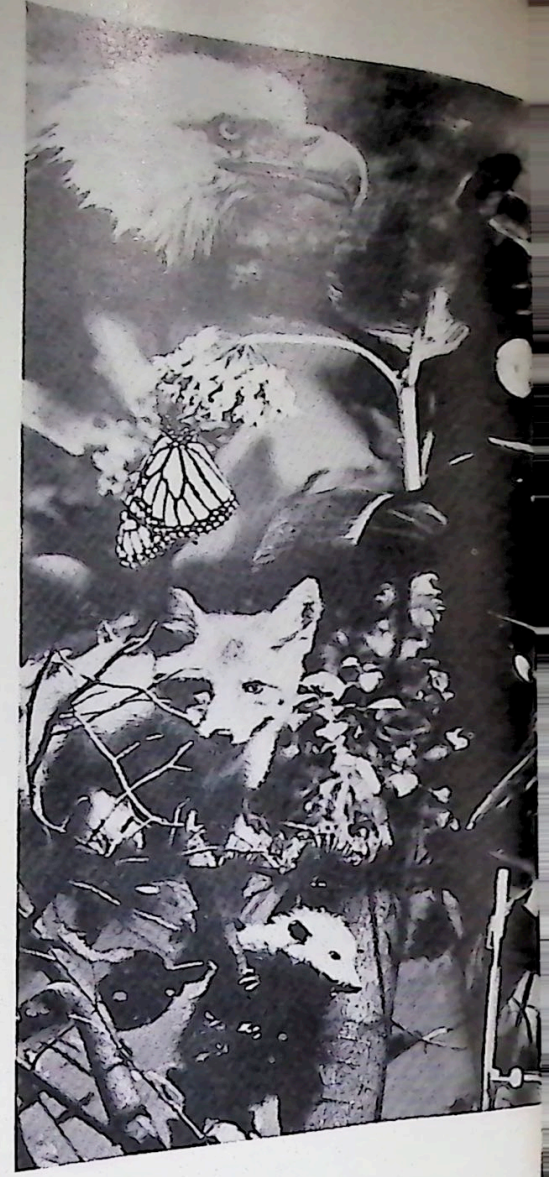
Technological and communications revolutions have a way of destroying the options of those who live through them. The businessman in the buggy whip business had no option. He adapted to the technology of his times, or he couldn't survive. Perhaps in education the same holds true. What option do we have to ignore the products of our communications revolution? If we do, what price will we pay? What will be the outcome of the desperate struggle for men's minds? Is all this just news of damnation—or can it be, if we will make it so, the *good* news of damnation?

The challenge comes at a difficult time. Many say we haven't the money to build the buildings, to train and pay the new teachers we need to absorb the flood of population pouring into our schools. How we solve these problems may determine how we live, a generation or two from now. Maybe we had better find the money. We always have. We have always met every challenge, striking to the core of things we believed in. If we had to go to war, we went. If we had to send a son, father, husband, we did. If we had to make more planes, raise production, break new records, we made, raised, and broke them.

We shall find room for a great new generation in our schools. We shall equip our classrooms with twentieth century tools. We shall build, not to the standards of the Russians, but to our own standards. We shall preserve in the twentieth century the right of men to live as we believe they must in dignity under God. ♦

# the story of ENCYLOPAEDIA BRITANNICA FILMS

## THE WORLD'S OLDEST, LARGEST AND MOST RENOWNED EDUCATIONAL FILM PRODUCING AND DISTRIBUTING ORGANIZATION CELEBRATES ITS 33RD ANNIVERSARY OF OUTSTANDING ACHIEVEMENTS AND DISTINGUISHED SERVICE TO EDUCATION



*Three leaders in the field of education who are responsible for the tremendous power of Encyclopaedia Britannica Films throughout the world: William Benton, Chairman of the Board, Maurice B. Mitchell, President, (center), and Adlai E. Stevenson, Chairman of the Advisory Board.*

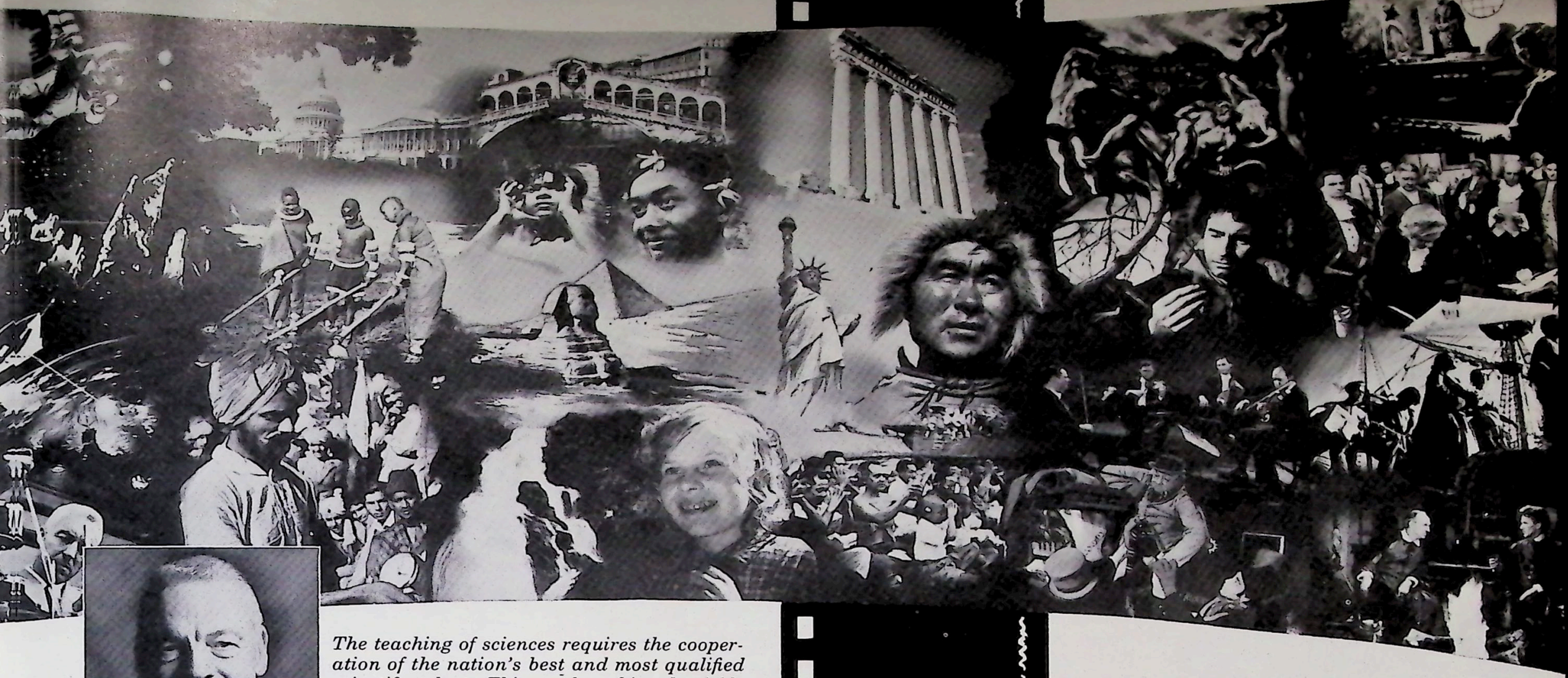
THE history of Encyclopaedia Britannica Films goes back to 1927, when moving pictures had been regarded as a purely entertainment medium in America for almost a quarter of a century. At that time, the Western Electric Company, manufacturers of movie projectors, felt that the development of a new field for talking pictures in schools would bring additional monetary rewards on patent royalties and increase the sale of their equipment. Through ERPI (Electrical Research Products, Inc.), a division of Western Electric, they became the first major film company to produce and distribute instructional sound motion pictures.

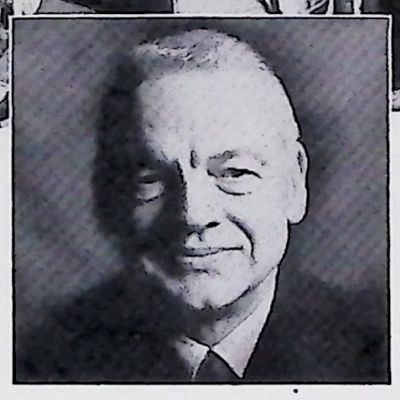
In 1932, ERPI, beginning to realize the value of classroom films which were produced in collaboration with highly qualified educators, joined with the University of Chicago to start the production of educational films based on the general courses then offered at the University. As a result, by 1936 ERPI was making a number of films each year on the physical and biological sciences, and a year later extended their film coverage to include the social sciences, history and the study of foreign cultures.

Chancellor Robert Hutchins of the University of Chicago, together with William Benton, then University Vice-President, believed strongly that the production and development of these vital new teaching tools should be in the hands of educators. They were keenly interested in the instructional films which were being produced by ERPI in collaboration with the faculty of the University, and they worked continuously for an even closer relationship with the film company. In 1943, they found the means to strengthen this union. In that year, William Benton was directly responsible for enabling the University of Chicago to accept from General Robert E. Wood, Chairman of the Board of Sears, Roebuck and Company, the gift of the great Encyclopaedia Britannica. After the Britannica was officially affiliated with the University, the ERPI Classroom Films were purchased from the Western Electric Company and the name was changed to Encyclopaedia Britannica Films. Thus, the University of Chicago, combining its vast resources with the creative skill of its affiliated corporation, the Encyclopaedia Britannica, became the leading producer of educational sound films. Hearing of the Britannica's acquisition of ERPI Classroom Films, the Eastman Kodak Company, which had for many years produced silent educational films for schools, gave its library of classroom films to the University of Chicago and withdrew from the field.

Camera and technical crews work throughout the world to bring authenticity and the drama of reality to Encyclopaedia Britannica films. Every Encyclopaedia Britannica Films' production is designed with the collaboration and guidance of an authority in the field of knowledge being

*Encyclopaedia Britannica Films is the 1960 recipient of the* WISDOM AWARD OF HONOR. *Maurice B. Mitchell, (left), accepts the coveted award on behalf of his outstanding organization from Leon Gutterman, Publisher of* WISDOM, *for "Significant Contributions to Knowledge and Distinguished Service to Education."*





*The teaching of sciences requires the cooperation of the nation's best and most qualified scientific talents. This can be achieved quickly and effectively by using the techniques of mass communication in science teaching.*

ROBERT M. HUTCHINS,
*Member, Board of Directors, Encyclopaedia Britannica Films*

filmed. The distinguished listing of these collaborators, representing the great universities, school systems and institutions in the United States and abroad, numbers more than six hundred. From the very inception of a classroom film idea—through every phase of its development to the time it is finished and ready to be used by the teacher—Encyclopaedia Britannica Films' research, editorial and production staffs work with distinguished educators and scholars to produce films especially designed for and integrated with textbooks and school curricula.

Maurice B. Mitchell, a brilliant and dynamic leader in the field of communications, was appointed in 1953 to the post of President of Encyclopaedia Britannica Films, which was then emerging as a wholly independent company. Mitchell has taken a distinguished position of leadership in the field of new techniques in education—teaching, writing and speaking on subjects related to the use of audio-visual material. He serves as Chairman of the Board of Associates of the National College of Education in Evanston, Illinois, and in 1958 testified dramatically in behalf of the classroom film before committees of the House and Senate.

The present-day Encyclopaedia Britannica Films organization has created an educational film library of more than eleven hundred films in which all fields of human knowledge have been dramatically capsuled. Hundreds of these films have been translated into more than a dozen languages and are available in color as well as black and white. Encyclopaedia Britannica Films covers the realms of the arts, social studies, sciences and the humanities, with films designed for primary and elementary grades through high school and college curricula. Complete filmed courses in chemistry and physics, language, and the humanities, all created by distinguished master teachers, have focused the attention of teachers and school administrators upon classroom film as a vital means of communicating knowledge.

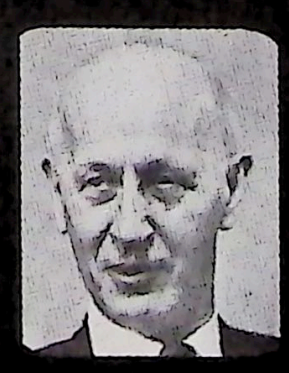
The classroom use of sound motion pictures represents the greatest advance in education in the twentieth century. Encyclopaedia Britannica Films, now celebrating its thirty-third anniversary as the world's oldest, largest and most famous educational motion picture producing and distributing organization, is bringing the world to the classrooms of conscientious teachers with truly creative educational motion pictures. For thirty-three years, this world-renowned educational organization has had one goal: to produce the finest audio-visual materials; to make them available in the majority of our classrooms; to provide films and filmstrips that are easily accessible to all teachers; to bring to the classroom the unique contribution—the educational film. ♦

*The development of well-rounded minds of deep sensibility requires a balanced education. In a society in which the everyday stress is on science, technology and material things, the well-rounded individual needs an outlook on himself and his society that is greatly enriched by the humanities. He needs to share in the traditions of human experiences, past and present, expressed in literature, the arts and music. A task of education is to bring these experiences alive and to enable every student in our schools to enjoy and appreciate them.*

CLIFTON FADIMAN,
*Member, Advisory Board, Encyclopaedia Britannica Films*

*The use of films and filmstrips, both for the enrichment of experience and the development of skills, is an essential part of an effective reading program.*

GEORGE D. STODDARD,
*Director, Encyclopaedia Britannica Films*



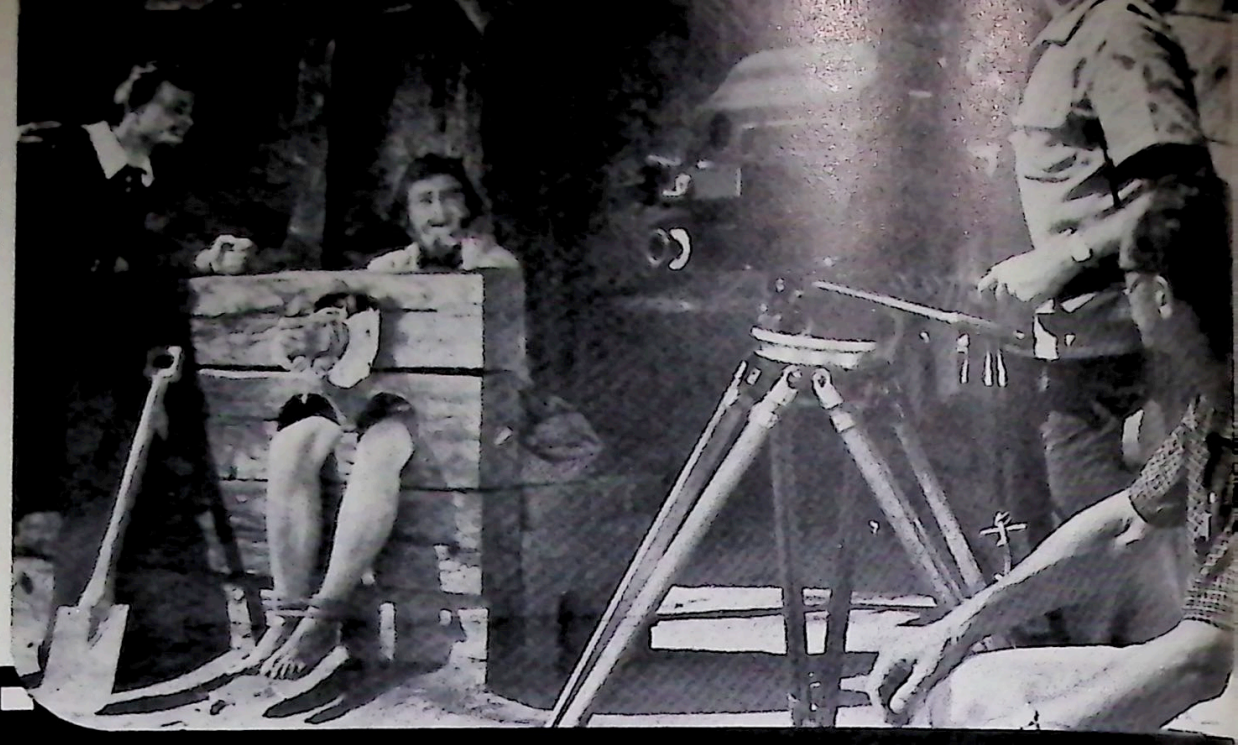
*We now realize beyond any doubt that films are the most valuable of all teacher materials. Good science films can communicate basic science concepts and prepare young people for concrete science experience.*

GEORGE N. SHUSTER,
*Director, Encyclopaedia Britannica Films*

*The motion picture brings to the classroom a learning experience that cannot be duplicated by any other teaching method.*

PAUL G. HOFFMAN,
*Director, Encyclopaedia Britannica Films*

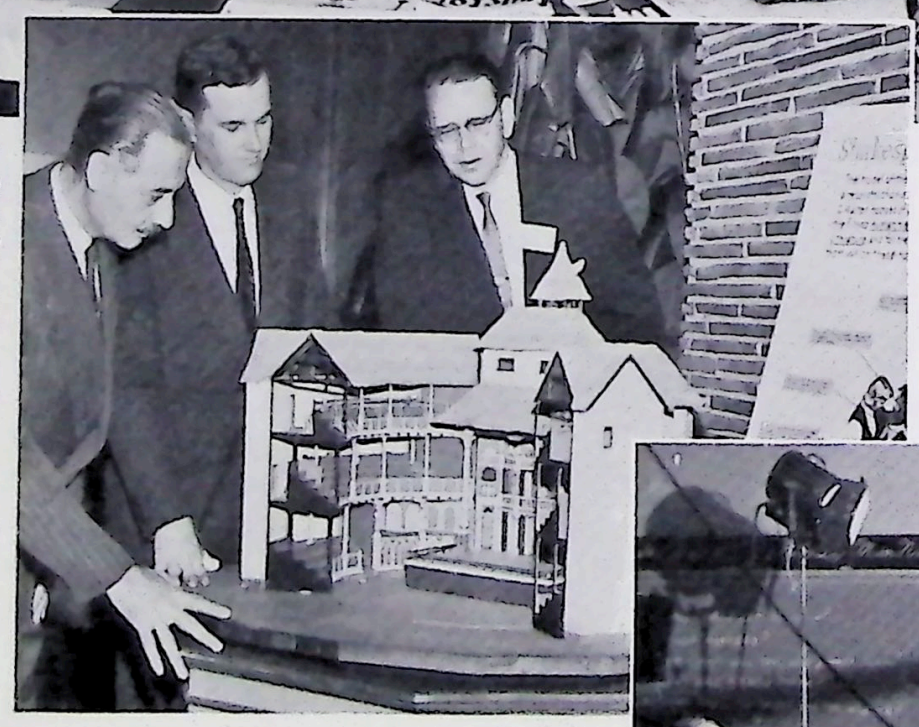
*Research and production for Encyclopaedia Britannica Films is the responsibility of a staff unique in experience, talent and teaching competence. Distinguished authorities work closely with producers to build into every film the utmost in authenticity and teaching effectiveness.*

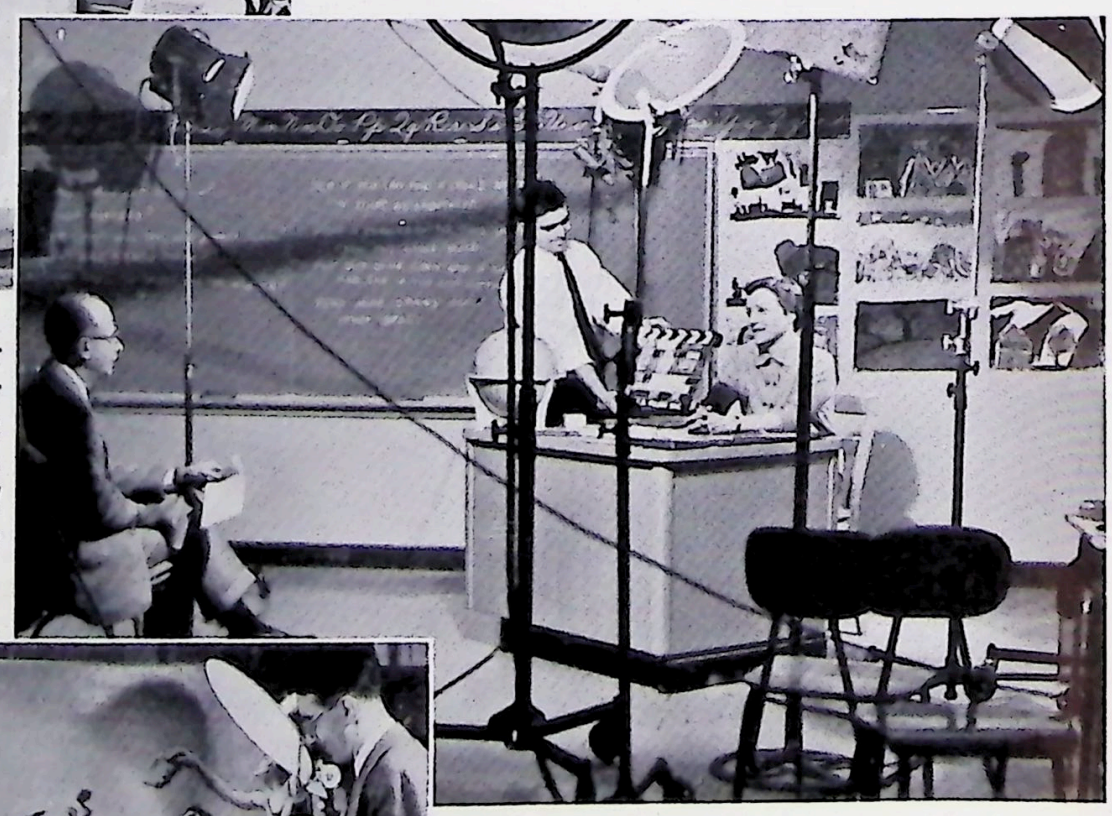


# PRODUCING FILMS for Teaching and Learning

*Painstaking months of preparation are spent before cameras begin to record action for classroom films. John Bobbitt (second from left), Director of Research, and his staff, verify every aspect of costume, scenery and incident. Then, collaborators are consulted; a script prepared; locations, actors and crews chosen; props gathered and other problems, varying with the subject of the film, are solved.*

*Charles Benton, (center), son of William Benton, Chairman of the Board of Encyclopaedia Britannica Films, displays the model of Shakespeare's theatre used in the series of 4 outstanding "Hamlet" films, featuring erudite commentary by Maynard Mack, Professor of English at Yale University, and superb drama by the Stratford Players of Ontario.*

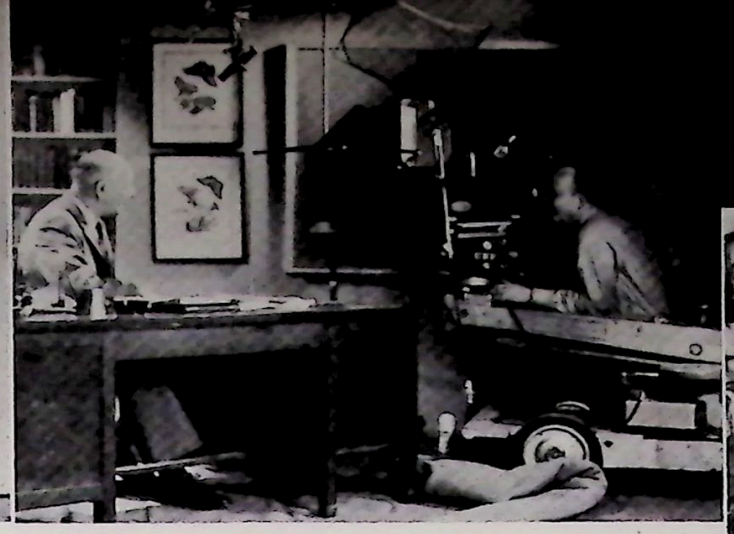




*John J. Walker is shown with school teacher Marie Stucki, shooting an introductory scene for "Corky The Crow." An Encyclopaedia Britannica Films producer must understand curriculum needs, write his own script, be able to select and direct the creative talents of others, have theatre sense and a practical approach to costs.*

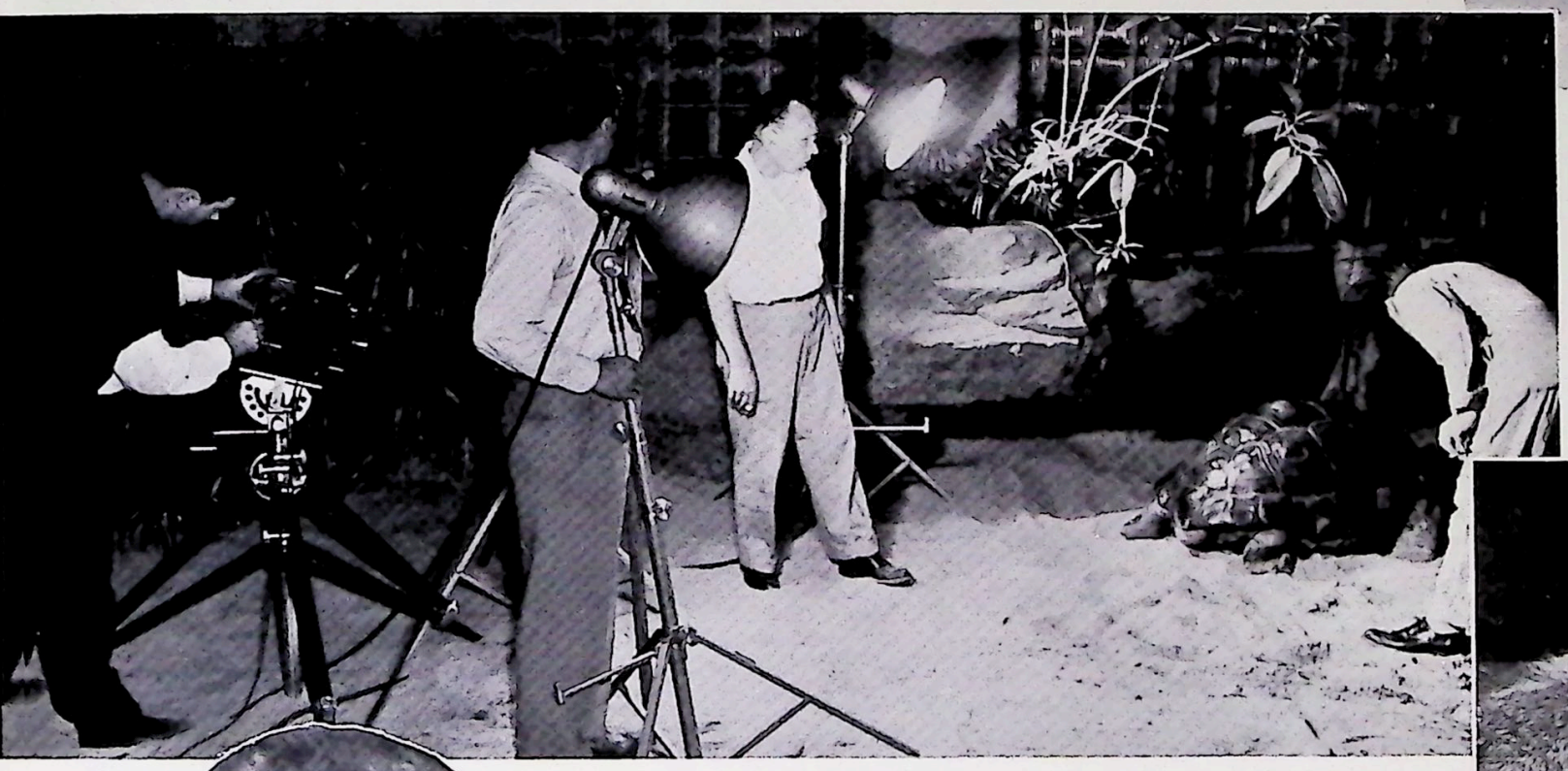
*The camera can go to places where a teacher cannot take a class—to the National Gallery of Art, for example, to see the very finest of its glorious treasures without distractions or tiresome walking. The camera can also bring to the class talents the teacher does not have, such as a demonstration of mural painting.*

*A member of the expertly trained staff of Encyclopaedia Britannica Films works on the animation for "A Trip to the Moon," a highly authentic portrayal of a journey into space produced in cooperation with the Adler Planetarium.*

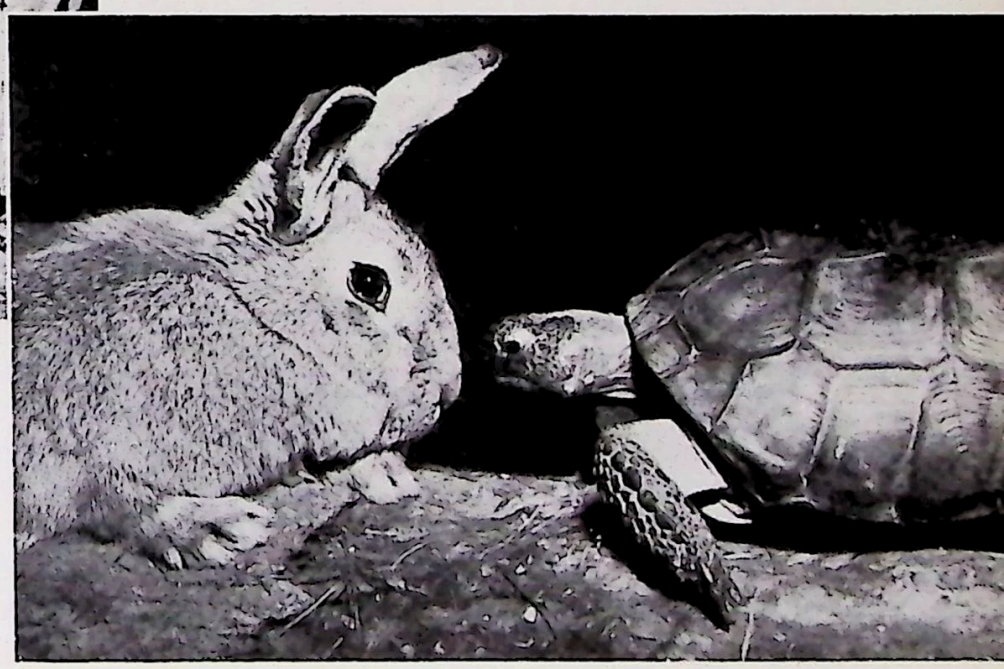


*Time-lapse photography—here used by cameraman John Ott to depict plant growth—enables teachers to demonstrate, through the use of educational films, movements too slow to be seen by the naked eye. The technique is especially useful in nature films, where understanding of growth and change is so important.*

*Nobel Prize winner Dr. George Beadle contributes to "DNA—Molecule of Heredity." He is one of hundreds of distinguished specialists who collaborate on Encyclopaedia Britannica films.*



*An Encyclopaedia Britannica Films director works with a great variety of "stars," most of whom have never been before the footlights. Filming a turtle, a baby, or a butterfly, creates problems that Britannica directors and cameramen take in stride, solving them with imagination and perseverance. It may be days or even weeks before the desired action is caught.*



*Live animals play all the roles in Aesop's "The Hare and the Tortoise"; actors portray his "The Golden Axe"; "Puss in Boots" is retold by animated puppets and hand puppets are used for "Little Red Riding Hood." The same varied and abundant creativity is used by Encyclopaedia Britannica Films to produce all their distinctive, sparkling educational materials.*

*Final ministrations from a hairdresser are given to the actor playing "Oedipus" prior to filming "Oedipus the King." Bernard M. W. Knox, Associate Professor of Classical Philology at Yale, in 4 filmed lessons on the play, creates a clear image of the critical spirit and intellectual achievements of the sophists, scientists and philosophers of 5th century Athens.*

*Professor Knox makes highly palatable to students background material on the age of Sophocles and his classic Greek tragedy, "Oedipus the King," considered parent of theatre in the Western World. Following his initial commentary, 3 lessons interpret the performance of key scenes from his new translation of the play and relate their meaning to the experience of today's literature students.*

*Everyone at Encyclopaedia Britannica Films is constantly striving to make every film as rich in content and authenticity as possible. In the making of historical films, much research goes into costuming, furnishings and customs and habits of the people of the period. Fact is carefully separated from fiction before a script is prepared. Authentic locations are used, as in the case of "Sir Francis Drake," filmed in England.*

*Photographing non-professional talent, such as an insect, may have unexpected results. The camera was rolling for a close shot of a small beetle for a film on insects when into the frame flew a robber fly, which, coming down like a helicopter, grasped the body of the beetle with its claws and soared off out of the frame. A perfect shot to add to a reel already teeming with drama!*

*The production problems involved in making educational films are extremely varied. A film like "Life in the Sea," a fascinating study of the interrelationship of sea plants and animals, requires special equipment, techniques and training. But it is just this kind of material that teachers need most for their classes—information about places, actions and concepts that words cannot adequately express.*

*Encyclopaedia Britannica Films' crews work in all parts of the globe to make available filmed material of life on every continent. The daily routine of families of different cultures becomes far more real and understandable to the student who sees it than to the one who only reads about it. "Eskimo Children" and "The Eskimo in Life and Legend" help students comprehend the unfamiliar life of the far north and the problems of that bitter climate.*

*The scope of Encyclopaedia Britannica films is tremendous, extending from the atom to the universe, from the Arctic to the Sahara, and including man as a biological being, in relation to his history and environment, and as an artist, musician, scientist and writer. The camera leads the way through the modern complex of knowledge.*

*Encyclopaedia Britannica Films' re-creation of the drafting of the Magna Carta includes the "Rise of the English Monarchy" and "Revolt of the Nobles and the Signing of the Charter." Under the able direction of Producer John Barnes, the motion picture was filmed in England; the Charter-signing scene was shot by the River Thames, very near the spot where the King, nobles and prelates must have gathered 700 years ago.*

*As head of an organization of hundreds of specialists producing and distributing educational motion pictures and filmstrips all over the world, Maurice B. Mitchell, President of Encyclopaedia Britannica Films, (upper right), is a distinguished leader in developing new techniques in education. He has campaigned intensively for wider use of audio-visual materials as essential tools in teaching every subject in the school curriculum. Producer David Ridgway handles the controls in this behind-the-scenes production activity.*

*When Mr. Mitchell, seen inspecting a new film print, was recognized for his outstanding leadership in educational motion pictures by the University of Denver with an honorary degree of Doctor of Laws, the citation lauded "his creative, forceful and dynamic stewardship in the increasingly vital field of audio-visual teaching" and his "myriad contributions to the communication industry." Under his brilliant direction, Encyclopaedia Britannica Films has pioneered to solve the critical problems of science education, resulting in the first complete introductory chemistry and physics courses on film.*

*William Benton, Chairman of the Board; Milan Herzog, Executive Producer, and Warren P. Everote, Vice-President responsible for the Research and Production, reflect the forward looking spirit which maintains Encyclopaedia Britannica Films in first place technically, mechanically and educationally, setting the style in audio-visual production for all the world.*



*Language is the great tool of the teacher—through it he may bring the whole world of things, ideas and feelings to his pupils—but language may also be the teacher's greatest stumbling block. The teacher and the textbook often use words which have no meaning for the pupil, who may hear or read every word and yet not understand. Classroom films give concrete content to a word. They also give life to a character or story by portraying a setting for a story, an event or a historical period, helping the mind grasp the scope of time and the relation of events to each other. Sight is the most important teaching medium and its potency should be recognized and used intelligently. Classroom films help students to learn through seeing— to learn fast and to learn effectively.*

*Maurice B. Mitchell, President of Encyclopaedia Britannica Films, shows the company's vast library of films to visiting youngsters. The world of human knowledge is contained in more than 1100 classroom films.*

# the Unique Contribution

*by Maurice B. Mitchell*
*President, Encyclopaedia Britannica Films*

SOME things are so big you just can't see them. Some things are so small you can't see them, either. Some things move so fast that no eye can follow them and some so slowly that one has to have infinite patience to teach people to see them. Some things are hard to understand and some can't be learned by reading. All of these problems in teaching, and many others, have existed in education for many years. Teachers everywhere, teachers of every kind of subject matter, have sought the solutions. I suspect we are closer to finding the answers today than ever before, simply because more people are seriously thinking about education today — and are motivated by a desire to really do something about it — than ever before. We have come to understand that education is something more than a service we owe every young American; that it may be a vital factor in our national survival; that brain power is a force which has world significance. Perhaps this is the most important outcome of all of this talk of critical times in education. More of us are thinking about it and more of us are looking for ways to improve the techniques of education — teachers and members of the community alike.

As we think about improving techniques in education, we think of using new communications devices. With our overloaded teachers and our overloaded curricula, and the many new things there are to teach in a complex society, it makes sense to reach out and employ new technology. Now, films are not really a "new technology." Motion pictures have been used in American classrooms for many years; indeed, this is one of the great advantages of the audio-visual teaching technique. There is already a large body of knowledge, materials and resources, in the form of educational films and skilled people who have learned to make and use them and are willing and anxious to teach others to use them. In Wilmette, Illinois, the home office of Encyclopaedia Britannica Films, I am surrounded by people who have been making these films for thirty-three years and who spend their time seeking ways to make the unique contribution which is the goal of the classroom film.

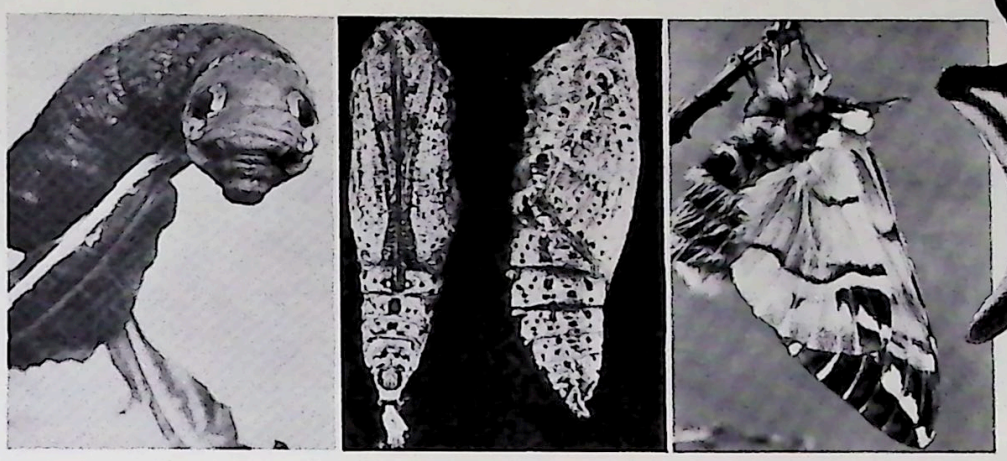
A typical problem they face is teaching teachers to supply the answers to questions that young people are asking these days about the newest phenomena of our society — orbits, rockets, satellites. It would be a difficult thing for me to explain to you, using a model or even a real rocket, how the rocket came to life, how it might be fired in such a way as to go into orbit and what that orbit would look like. I would have to try to take your mind's eye to some point in outer space and let you look back at the world, just as we did in the film, *Rockets: How They Work.* Through the miracle of animation, in this film one can indeed "look at the world" and see what it means when we say "a rocket goes into orbit."

*Freed from the surface of the earth and the atmosphere that surrounds it, rockets can become explorers into new worlds of knowledge. The film, "Rockets: How They Work," dramatically presents basic tenets of rocket flight.*

*Many examples of action and reaction illustrate the principle which makes a rocket move in the exciting film, on which Willy Ley, well known writer and consultant on rockets and space travel, served as collaborator.*

*The rocket fires and takes off through the flames in a vividly spectacular shot. Other fine films on related subjects include "Earth Satellites," "A Trip to the Moon," "The Earth in Motion," "The Solar Family," and "The Moon."*

You get some idea of the vexing nature of the teacher's problem when you realize that some everyday things just aren't easy to explain. We tell a child, for example, that a caterpillar turns into a butterfly. When the teacher asks him on the quiz next Friday, he'll repeat that a caterpillar turns into a butterfly, but the chances are he won't know what he's saying and won't really understand the process. This is where the educational film maker frequently gets in his best licks. He uses the magic of time-lapse photography, filming action that takes hours and days, weeks and months, and compressing it into a dramatic few moments, as we did in the *Monarch Butterfly Story.* He uses animation and extreme close-up and photomicrography and he turns an event that can't have meaning—unless you personally participate in it and observe it yourself—into one that has deep educational significance.



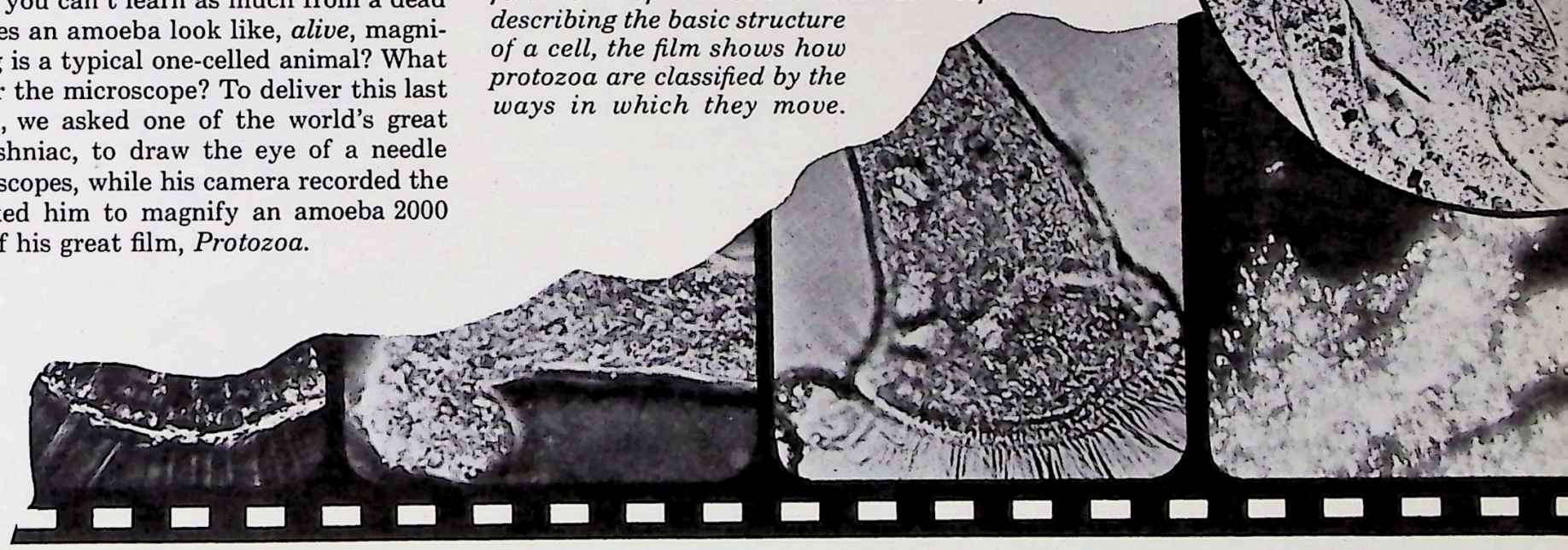
*In the "Monarch Butterfly Story," Encyclopaedia Britannica Films has brought to the classroom a dramatic and detailed study of one of nature's most fascinating insects. Graphically portraying a life cycle story of infinite beauty and interest, the film shows the 4 stages of butterfly growth—egg, larva, chrysalis, and imago—which are completely explored. Extreme close-up photography clearly depicts form and coloring of the male butterfly.*

*The new butterfly tries its wings, rising in the sun.*

There are some things the eye can't see, because they are just too small. Here, the producer of classroom films extends the range of the human eye far beyond its ordinary abilities. On a microscope slide, for example, you can't see an amoeba with the naked eye. Students, as a matter of fact, can barely see it with the kind of microscopes they use in the classrooms, even where there are enough microscopes for the students. Magnified 50 or 100 or 120 times, it just doesn't look very big or very detailed. It also looks quite dead and you can't learn as much from a dead amoeba as from a live one. What does an amoeba look like, *alive*, magnified 2000 times, in full color? How big is a typical one-celled animal? What do one-celled animals look like under the microscope? To deliver this last bit of information to the classroom, we asked one of the world's great microphotographers, Dr. Roman Vishniac, to draw the eye of a needle across the field of his powerful microscopes, while his camera recorded the sight in color film, and then we asked him to magnify an amoeba 2000 times, living and in color, as a part of his great film, *Protozoa.*

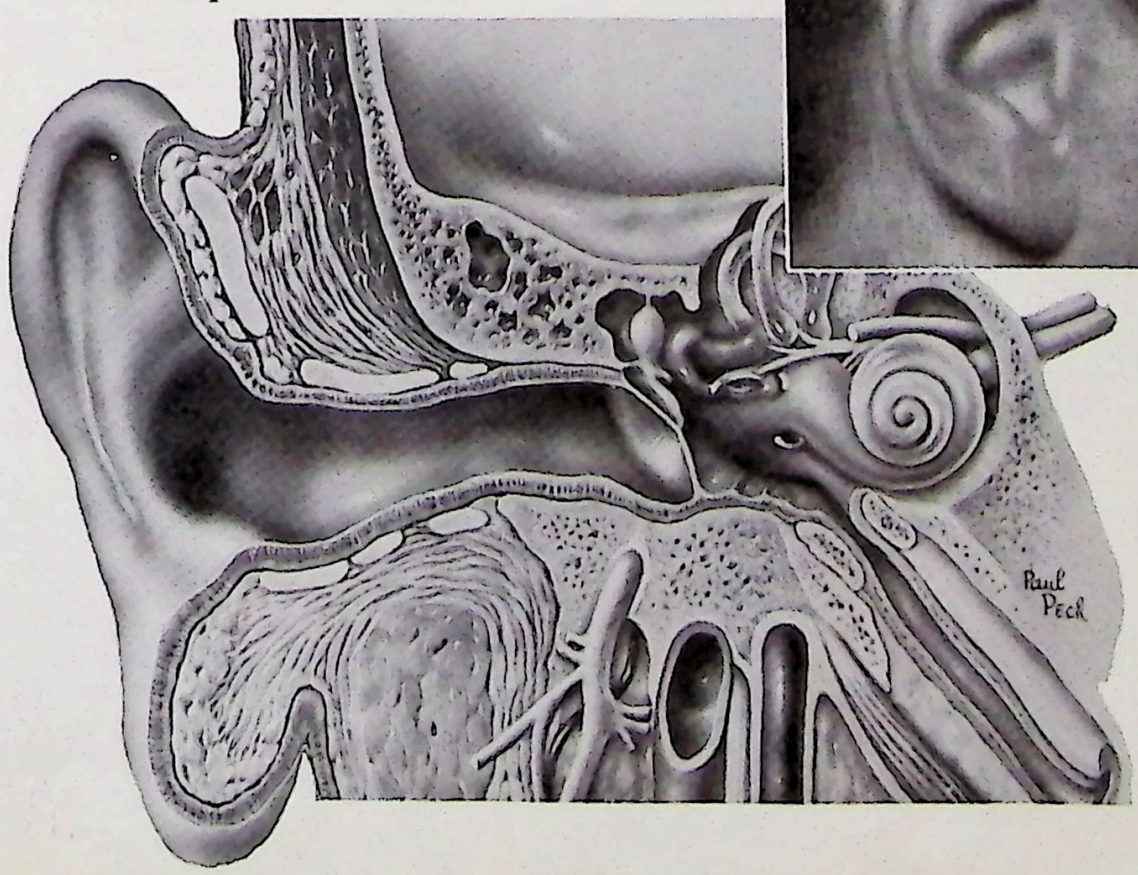
*Under the microscope, a drop of water teems with minute life, as filmed in "Protozoa." Photography reveals the size of the one-celled animals: hundreds of them swim about in the eye of a needle.*

*Photographed by a master of color photomicrography, Dr. Roman Vishniac, "Protozoa" vividly portrays the variety and life functions of one-celled animals. After describing the basic structure of a cell, the film shows how protozoa are classified by the ways in which they move.*



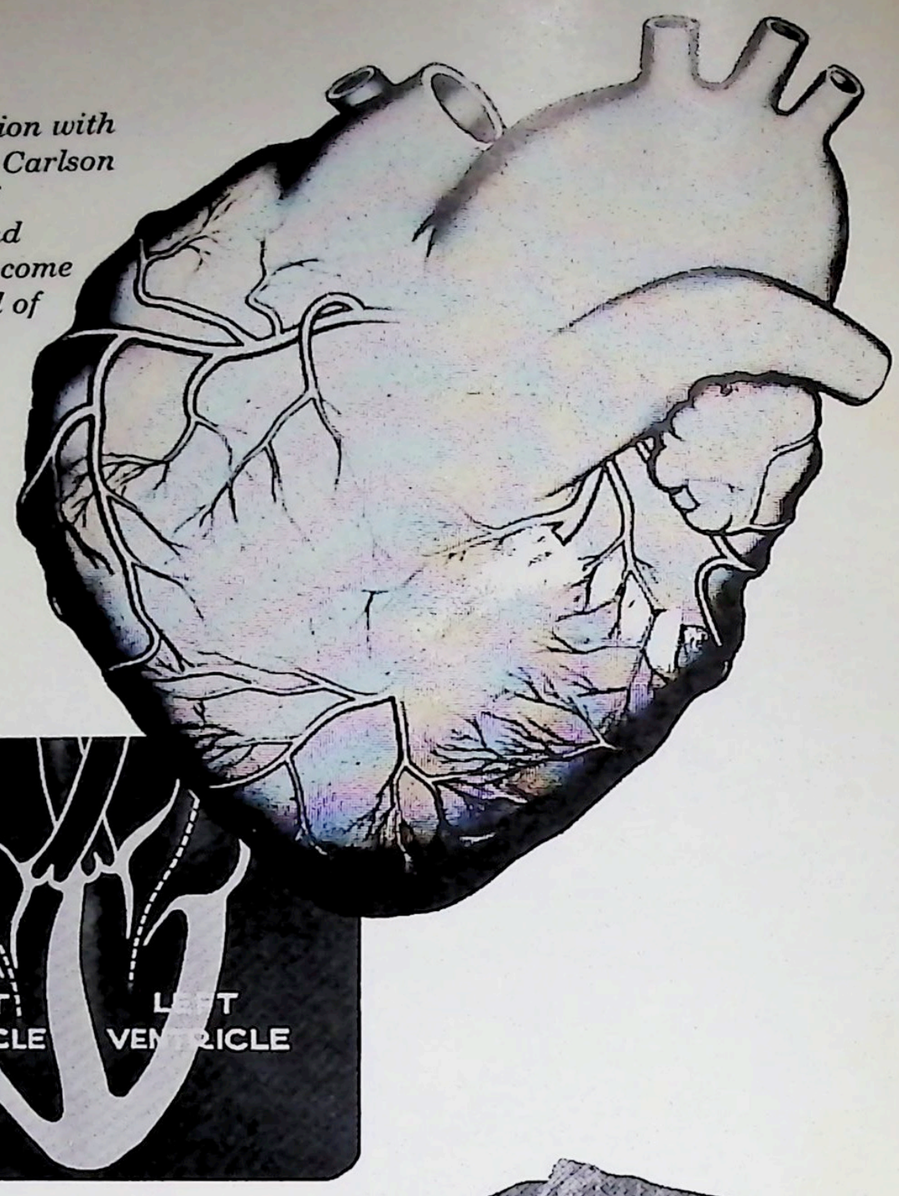
How do you deal with things that are invisible, that our eyes can't see at all and that can't be magnified? In the study of the human body, that important aspect of biology where we investigate ourselves and learn how to protect and take care of our bodies and maintain our health, we seek to understand something about the living processes which affect us. How would you teach sound and explain how people hear sounds? You can't *see* sound—how do you give a meaningful experience to a young person to whom you're teaching it? Our cameramen told us that about the only way this could be done on film would be to take a camera inside a human head and look out through the ear. This isn't easy to do (with most human heads), but they said it was the only way to see the middle ear, as it actually looks; see the ear drum vibrate, see those three bones—the hammer and the anvil and the stirrup—doing whatever it is they do that communicates a sound wave sensation at the eardrum to the brain. With tremendous ingenuity in a piece of film that is known all around the world and is widely believed to be one of the most effective pieces of teaching films ever made, they did just this in *The Ears and Hearing.* They matched animation—moving drawings—in a remarkable piece of photography.

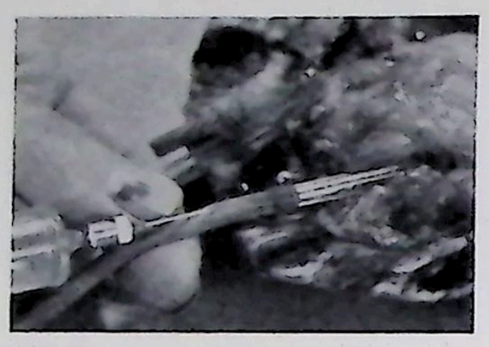
*"The Ears and Hearing" demonstrates how the ear—a tremendously complex and delicate mechanism—transforms sound waves into nerve impulses which are then interpreted as sounds.*



The human body offers a good opportunity to use the sound motion picture in education. Almost all of it is difficult to understand and see in action and certainly difficult to demonstrate in the classroom. Take the human heart, which beats inside every one of us. You can hardly hear it beating and you can't see it under ordinary circumstances. It is a vital part of our complex body mechanism, and it is a complex mechanism in itself. How does it work? How does the heart pump? How does the blood get around? What do we mean when we say the heart is a pump? What do we mean when we talk about heart valves? A valve to a biology student who has never seen a heart valve might be like a faucet in a sink. When you see it in autopsy, it is just a wrinkled, meaningless piece of membrane. But when the camera gets inside the heart and looks out through a valve while the heart is beating, then you begin to understand the function of a valve. And when the skilled animator takes the heart as a pump and with a series of moving drawings shows you just how it functions, then you have another of the unique experiences that only presentations like the Encyclopaedia Britannica film, *Heart and Circulation,* can bring to the teacher and the classroom.

*Made in collaboration with Professor Anton J. Carlson of the University of Chicago, "Heart and Circulation" has become a classic in the field of instructional films.*

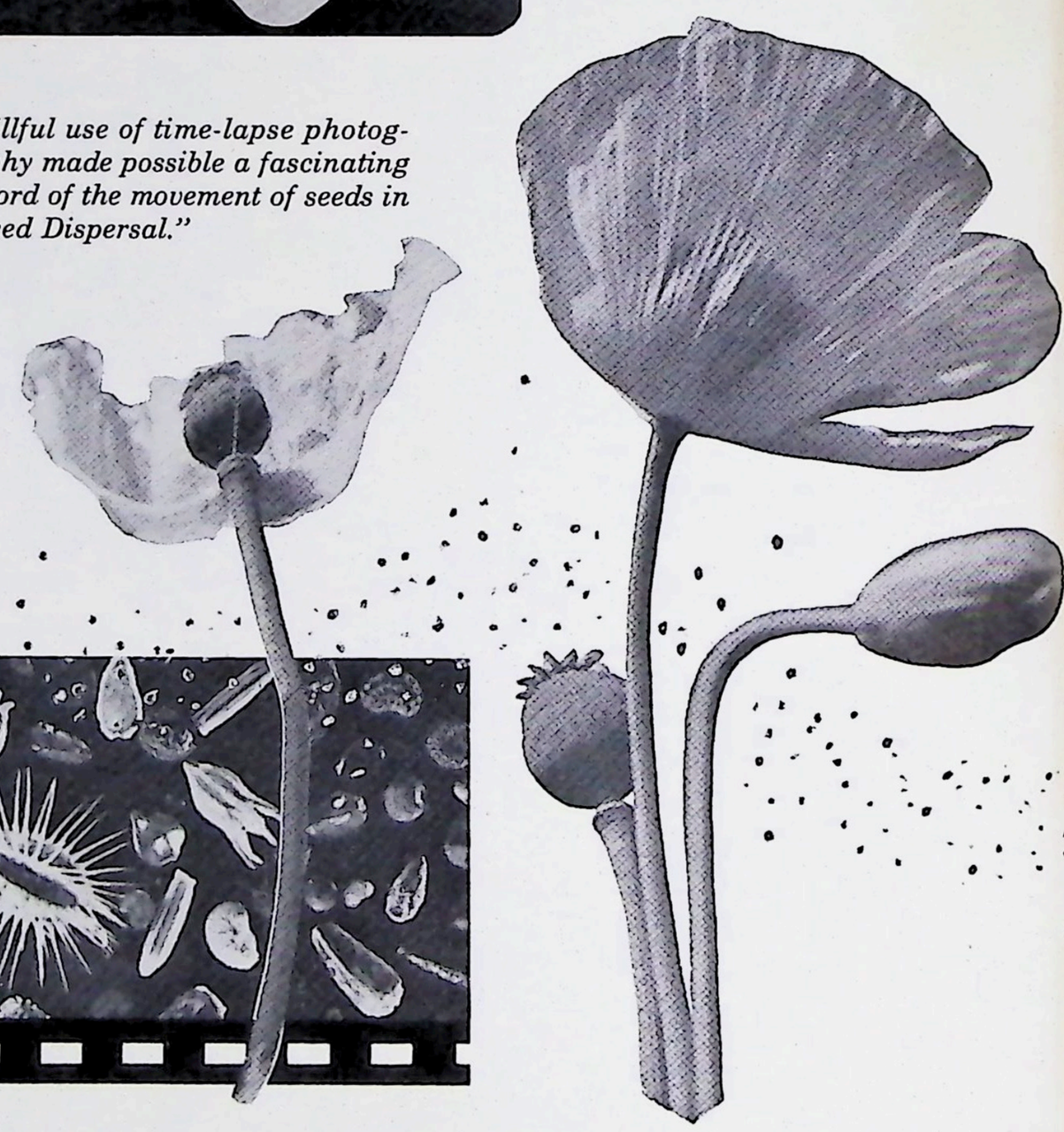


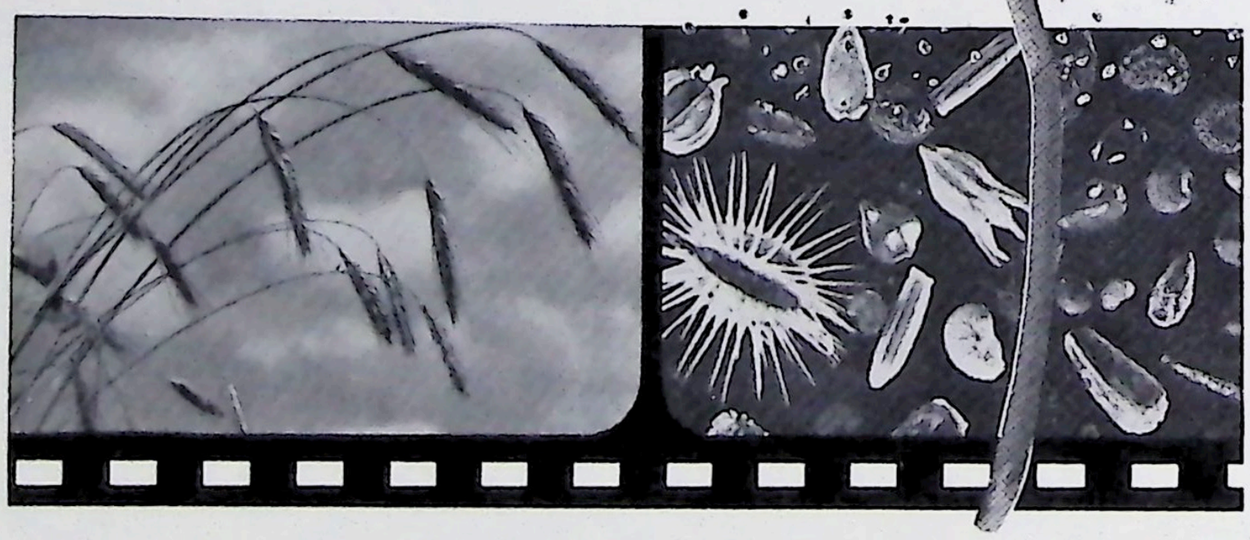
*Factors affecting the heartbeat rate and blood flow are shown in "Heart and Circulation." Adrenalin injected into the heart stimulates it to beat faster than the normal 70 times a minute.*

In another field of biology, leaving the human body and going out into the world around us, we consider the things that young people see and ask about — plant life, for example, so important in botany and agriculture. How do plants grow? How do they reproduce themselves? A plant on my desk is growing as I write, and at some point it will try to find a way to reproduce itself. The key to plant reproduction lies in seeds, which are in some way produced by the plant and dispersed by it, yet if you planted these seeds in a classroom, you'd need a twenty-four-hour shift, day after day, to see them turn into plants and in turn make seeds and disperse those. We made a film about this twenty years ago; our technological skills in film making have improved and so we've produced a second edition, titled *Seed Dispersal.* Here's another way a film lives forever, in a sense. All of those old first editions come back to us. Now, with the cameraman's new skills, we make a brand new film and trade it for the old one—something that doesn't happen quite as frequently in libraries and with books.

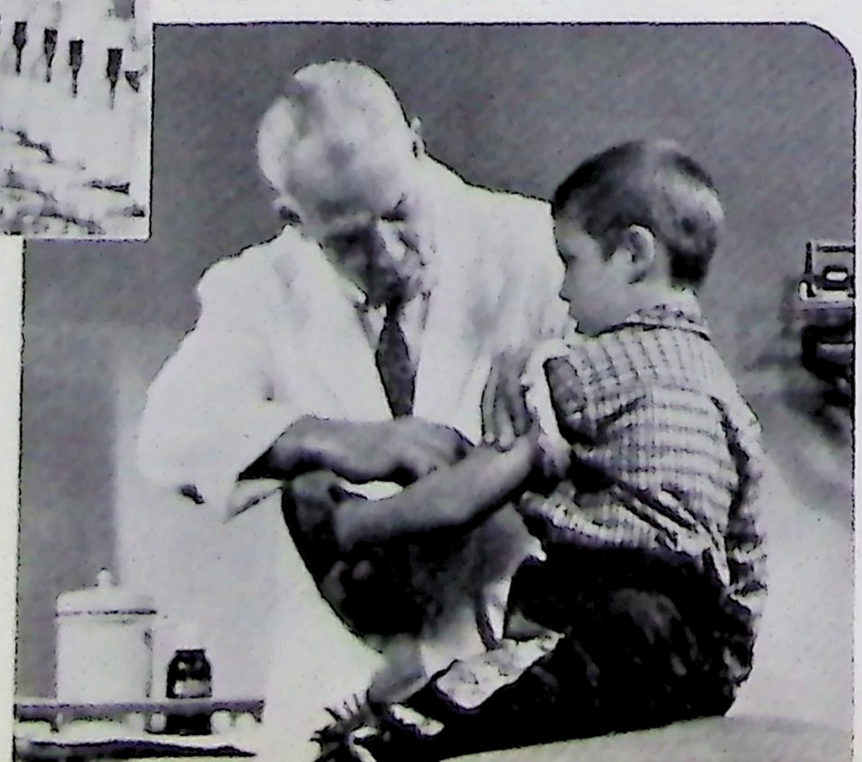
*Skillful use of time-lapse photography made possible a fascinating record of the movement of seeds in "Seed Dispersal."*



*Vital areas clarified in the film are the functions of seeds in the reproductive process, the most important methods by which seeds are scattered, special structural devices of seeds that aid in dispersal, germination, and factors which influence a plant's chance for survival once germination has begun.*



*The vital work of the Department of Health is dramatized in the film, "Health in Our Community," which shows laboratory technicians in the fight against the spread of germs.*



Traditionally, teachers have investigated the community by taking their classes on field trips, with all their interruptions in routine, discipline and time lost from the teaching process itself. But suppose you wanted to take a class to investigate the health of the community — what one place would you take them to? Where would you go to show them how the many people involved in guarding the health of the community work together? This is one of the contributions the film maker also delivers to the classroom. He synthesizes time and space; he shows, within the framework of a few minutes, the interrelation of all the people who fight to protect the health of the community. Using another one of his skills, the montage, he shows us quickly and effectively, within a single moment of a most informative film, *Health in Our Community,* how the community defends its health.

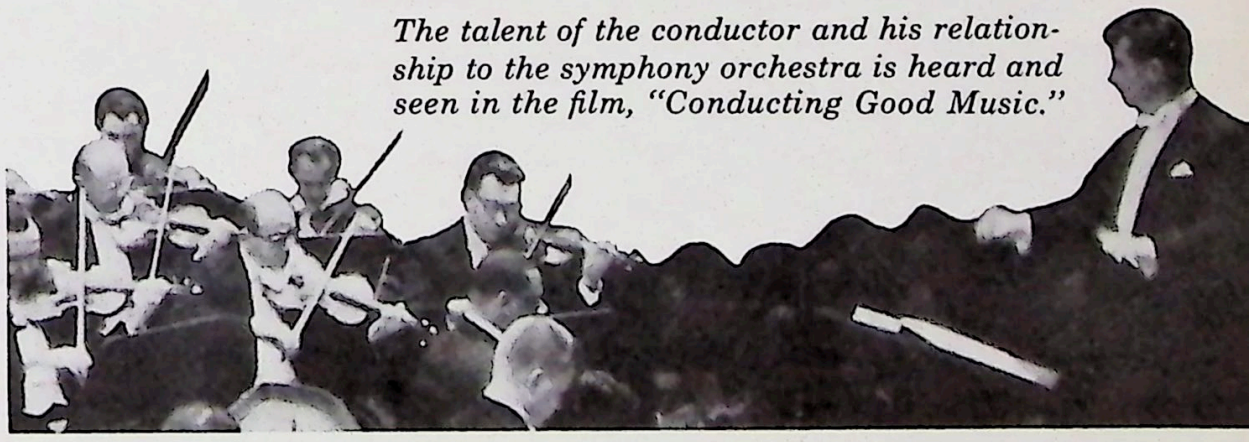
If you had to, you could frame a series of field trips that would get you around to see the sights involved in studying the health of the community, but when you leave the community and the neighborhood and the town and area in which you live, then the field trip disappears as a possibility. Yet the challenge increases every year to understand the world around us—the other countries, how people live—to get some understanding of the problems people face who live in lands we may never visit in all our lives. These are the people we have to understand and deal with in this new kind of global society in which we live. How do you get a class to Peru, to the Andes, to twelve thousand feet up in the air? The Encyclopaedia Britannica cameraman does it in the film, *Peru: People of the Andes,* by visiting it for them, by seeing the community through their eyes, by wandering through the market place, into their homes, by studying their activities; by showing children in the United States what a boy in Peru does in school, how he helps his father, how a little girl helps her mother, what family existence is like in Peru.

*In the highlands of the towering Andes Mountains of Peru live the Indians, who are descendants of the highly developed Inca civilization and subjects of the colorful film, "Peru: People of the Andes." Centering around the lives of one family in the Chincheros Valley, the film highlights their day-to-day activities in the field, home, village and school. Main source of income is the herd of sheep, which belongs to the entire village, with wool their most important export.*

The camera sees beyond the horizon, into lands we wouldn't otherwise see. We've made it slow up and accelerate the processes of nature, look inside solid objects and view the insides of a human body, making these things clearly understandable. What about events that took place long before we were born, things you might have to struggle to learn about only by reading, because they occurred so long ago that no one is now alive who can tell you about them? Can the camera turn its eyes back into time? Yes, it can. Here a whole new range of talents come into being. The good educational film producer has the ability to recreate in believable form events in history, those things that have happened throughout man's existence on earth, that bring to us today the traditions which are so significant and which we must understand if we are to have a sense of how the world got this way and where it might go from here. Here, with great skill, the cameraman dresses sets, finds exactly the right costumes, the right artifacts, the right words for actors to say; all these combine to give us a chance to "live again" in the events of historic times. One of the great such experiences is the film, *The Pilgrims,* made by John Barnes, a sensitive Encyclopaedia Britannica Films staff producer who went to England to produce an image of the Pilgrims for school children all over the world. This isn't the traditional Pilgrim film you might imagine, with the buckle shoes and the fowling piece and turkey at Thanksgiving. It gives depth and sensitivity and meaning, not just to the Pilgrims and their celebration of Thanksgiving, but to the extent to which man will go to defend his rights, the amount of suffering he can endure in search of goals he believes in and understands. If we really want to teach tolerance, if we hope to give our young people a sense of what people were willing to suffer to found our country and our traditions, perhaps this is the best way to do it.

We learn from teachers and students that education by film is an enjoyable process, even though the subject matter in itself isn't entertainment; but sometimes the film becomes just a sheer pleasure. This is especially true when it goes into fields of enjoyment, such as music and the arts. One doesn't ordinarily think of the motion picture as a way to teach music appreciation. We're accustomed in school to sitting back and listening to records. Yet, one can become personally deeply involved in a motion picture about music, such as our film, *Conducting Good Music.*

*The talent of the conductor and his relationship to the symphony orchestra is heard and seen in the film, "Conducting Good Music."*

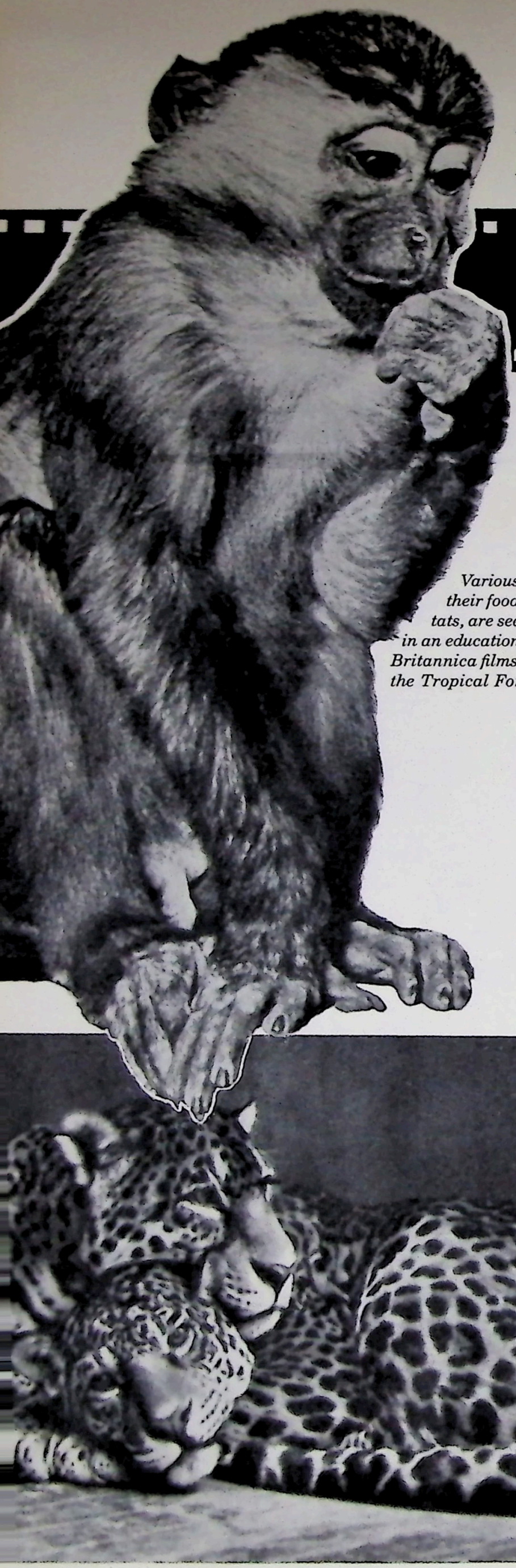


*The relentless tides of conflict and persecution which brought the Pilgrims to the shores of the new world are recreated in "The Pilgrims," bringing to life one of the most significant episodes of American history.*



The Encyclopaedia Britannica films themselves tell the story, far more effectively than I can, in any written or spoken piece. It has always been the films themselves—in the hands of alert, interested and forward-looking teachers—that have made the great contribution to some of the things we've been able to do in our classrooms. Now we must realize that these tools *have* been created. They *are* available to all peoples everywhere. They *have* a place in every classroom. They are *needed* in every classroom—now. Never in the history of our country have we turned our backs on a challenge to use modern devices, the most advanced techniques, to solve our problems. Certainly in education we have a critical problem, and certainly in education we will make our greatest contribution by providing to those who deserve them most, our teachers, the tools that have been created to help them do the job that's so important to us. ♦

# learning about ANIMALS



*Various types of monkeys, their food, habits and habitats, are seen in vibrant color in an educational Encyclopaedia Britannica filmstrip, "Monkeys of the Tropical Forests."*

SPRING is a time of beauty and new life, a time for nest-building and for rearing young. That it is also a time for watchfulness is clearly brought out in the Encyclopaedia Britannica film, *Animals in Spring*, because unless the young avoid enemies, they may not grow to maturity.

In spite of all the hazards—fire, flood, heat, cold, disease, and predators—nature provides an infinite variety of means which permit many animal species to survive over long periods of earth's history, as is seen in the film *How Nature Protects Animals.* Here a review of all defensive adaptations makes it evident that most of them fall under three main headings: hiding, fleeing or discouraging attack. Antelope, for example, have no place to hide in the open prairies where they live, but their keen sight and hearing help them keep a distance between themselves and their enemies.

Animals move in a variety of ways, depending upon their environment and needs. Some animals, such as elephant seals and sea lions, live both in water and on land and are equipped with flippers which, while more effective in water, also serve to propel them on land. The kangaroo moves by hopping; mountain sheep have tough, sharply pointed toes to help them climb; squirrels have sharp claws for clinging to bark and branches of trees, in which they climb and run to find food, shelter and safety with sure-footed agility; monkeys, with their grasping hands and prehensile tails, are equally well equipped for tree climbing. These and other kinds of animal, bird and insect movement, are graphically illustrated in the film, *Animals—Ways They Move.*

Dramatic close-up scenes in *Animals—Ways They Eat,* disclose the various body parts animals have, both for getting to their food and for eating. Many animals have teeth with which to bite off pieces of food, and chew with them as humans do. A number of animals have noses which are especially helpful in feeding. The hog has a tough disk at the end of its nose, which it uses for digging up roots; the elephant uses its trunk to tear off grasses and to carry food to its mouth. Certain animals, like squirrels and chimpanzees, are expert in holding food with their forepaws.

That the world of nature is far from idle is the subject of *Animals at Work in Nature,* which reveals the special body parts animals use as tools to drill, weave, carry, glue, suck, dig and chew—work which animals, birds and insects must do to survive.

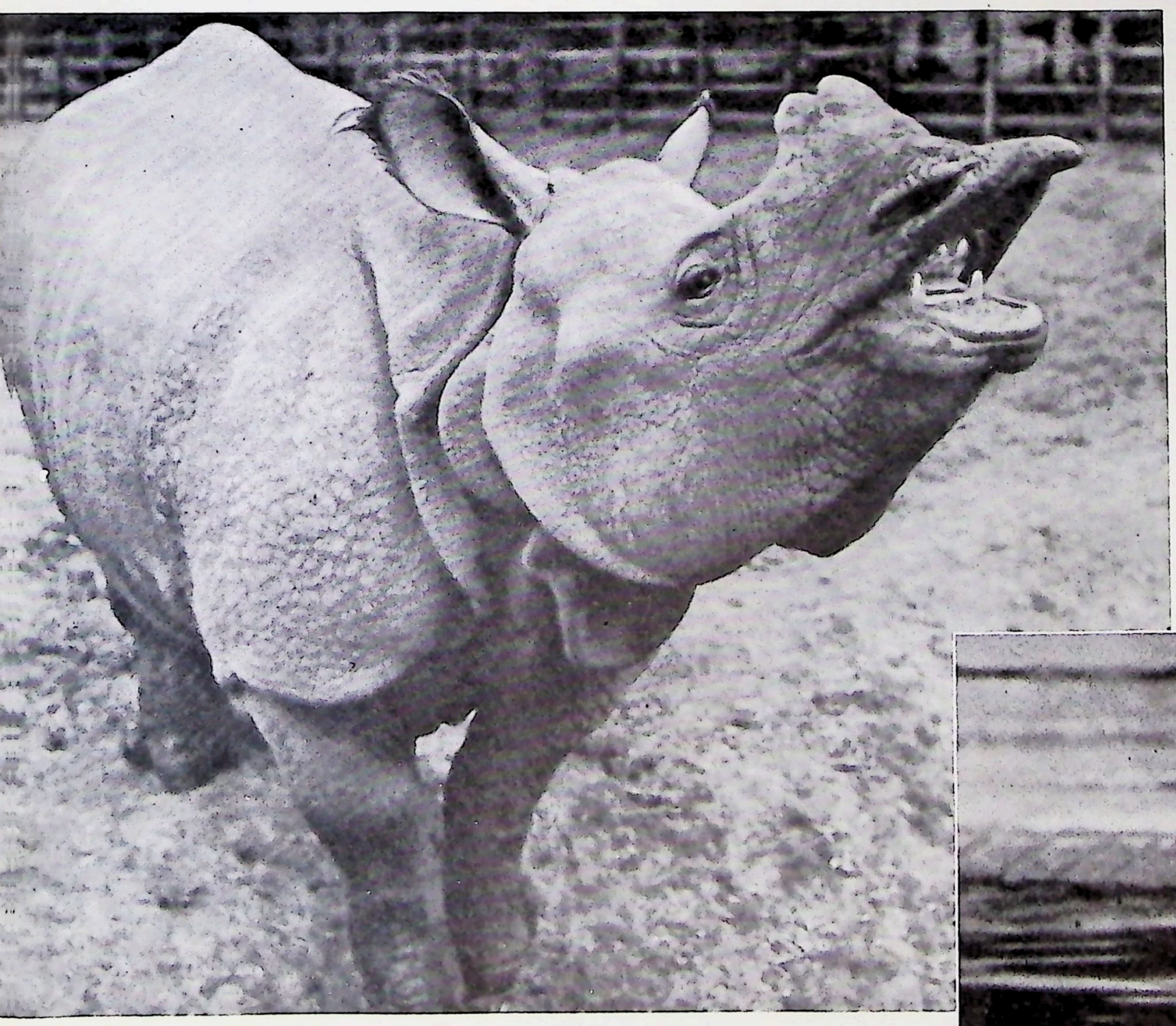
Additional Encyclopaedia Britannica films present captivating facets of animal life in dramatic fashion. *Elephant Baby* gives a true account of the daily activities of working elephants and the people who train them, against the vivid setting of tropical rain country in Mysore, India. *Animal Town of the Prairie* discloses the fascinating and highly organized underground colony of the prairie dog. Members of the animal kingdom from all over the world come into the classroom on these and other Encyclopaedia Britannica films. ♦

*The largest of the American cats, the jaguar, ranges from Texas to Patagonia. Asia and Africa are home to other members of the cat family, which includes such sleek beauties as the tiger, ocelot, puma, lynx, cheetah, leopard and lion, in addition to the domestic cat.*

*The European mouflon is a wild sheep originating in Corsica and Sardinia.*

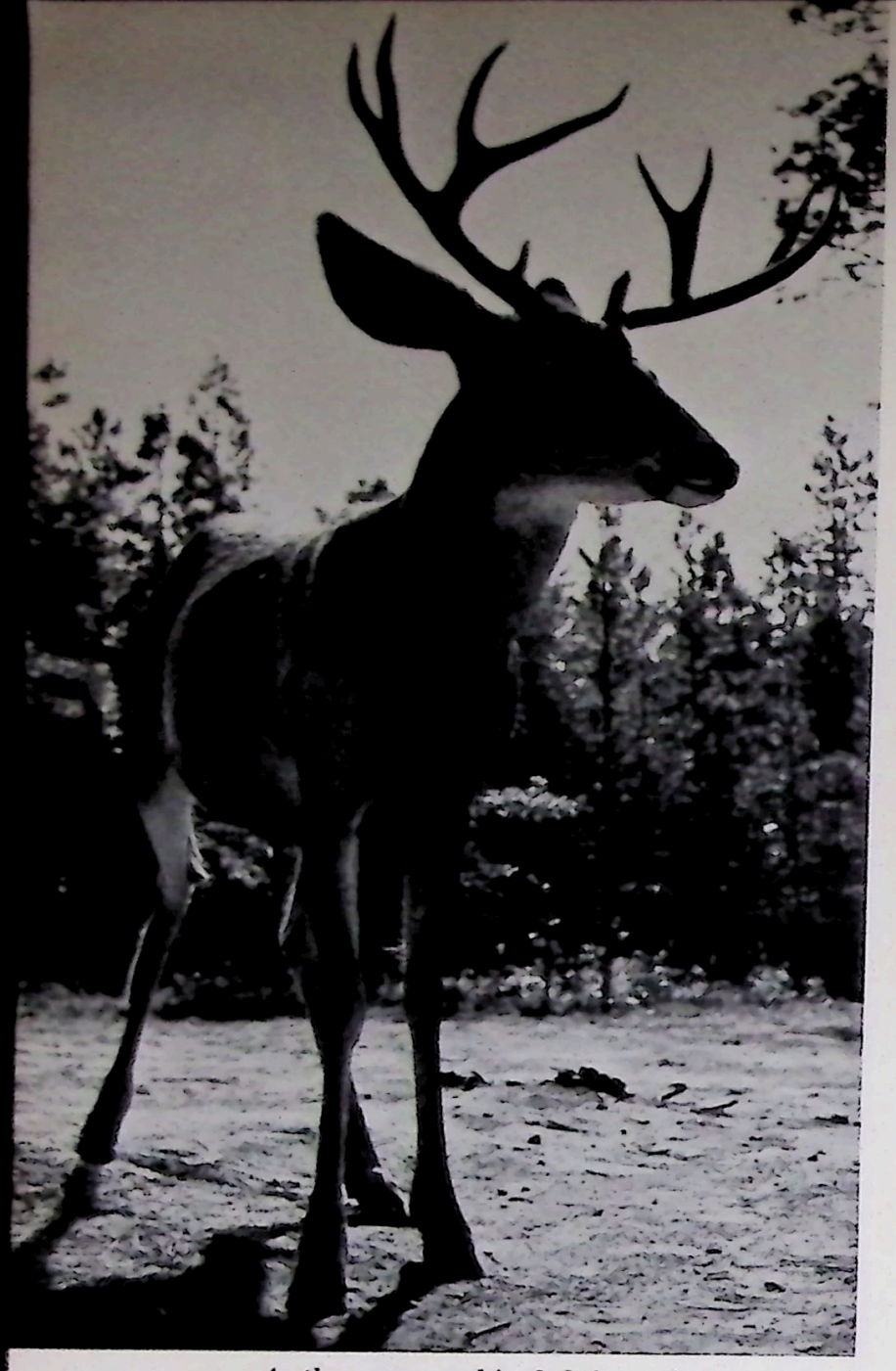
*The powerful hind legs of the kangaroo, in addition to providing swift locomotion, are a potent weapon, while the tail acts as a prop. The hopping marsupial is a native of Australia.*

*All members of the animal kingdom come under the close scrutiny of Encyclopaedia Britannica Films cameramen. Because of the diversity of films produced, the lives of most animals, in almost all their interesting aspects, are delightfully portrayed. The latest in camera techniques and equipment make such intimate films possible.*

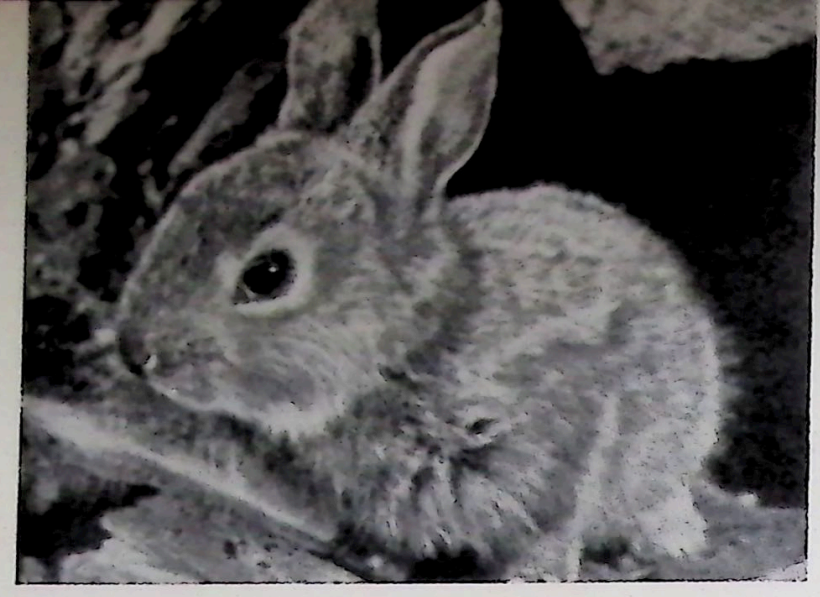


*A bad temper coupled with little intelligence characterizes the massive rhinoceros, but a thick hide and sharp horns tend to keep him out of serious trouble. The white rhinoceros is the largest living land mammal except for the elephant.*

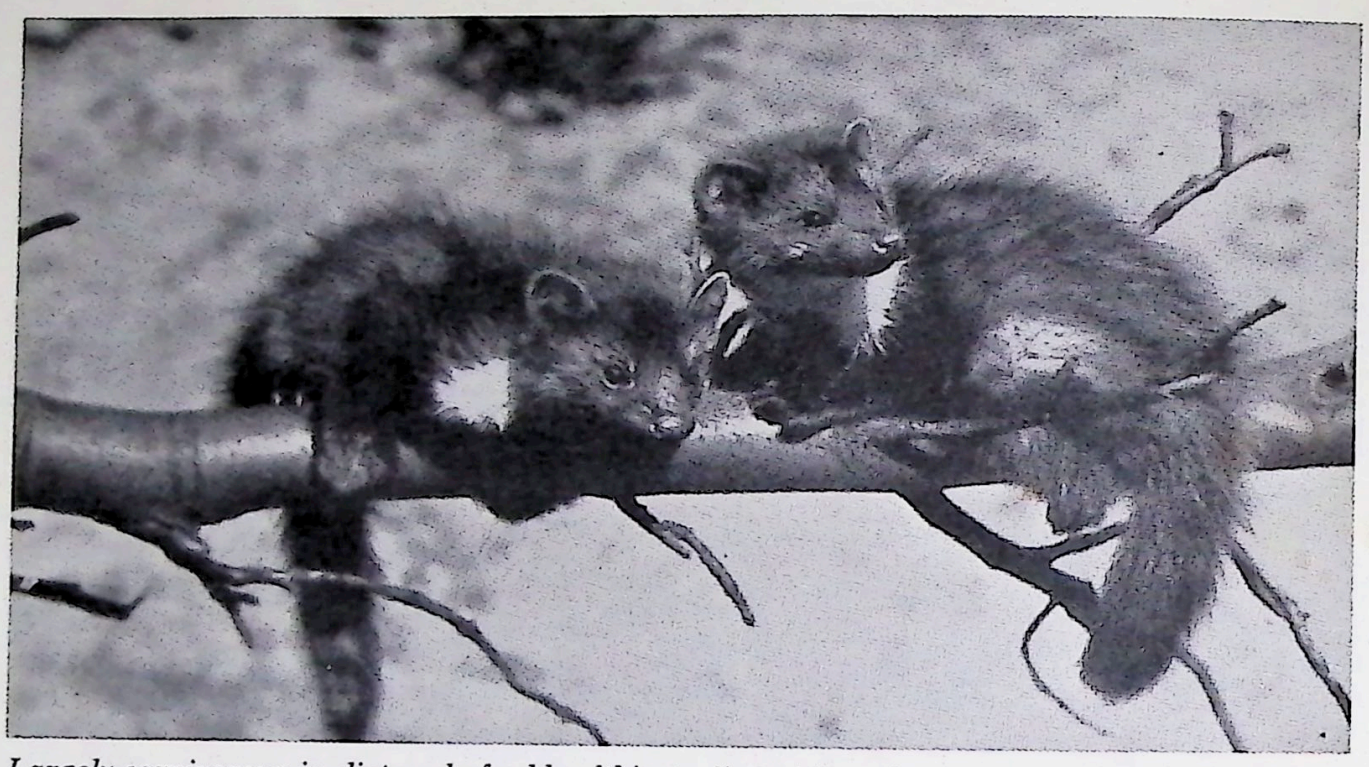
*The hippopotamus, of a mild and inoffensive disposition, can exhibit great ferocity when wounded or defending its young. Its immense strength and agility, despite its bulk, render it a formidable antagonist.*



*Antlers are used in fighting other stags and only as a last resort for defense, as deer trust to their fleetness to escape an enemy.*

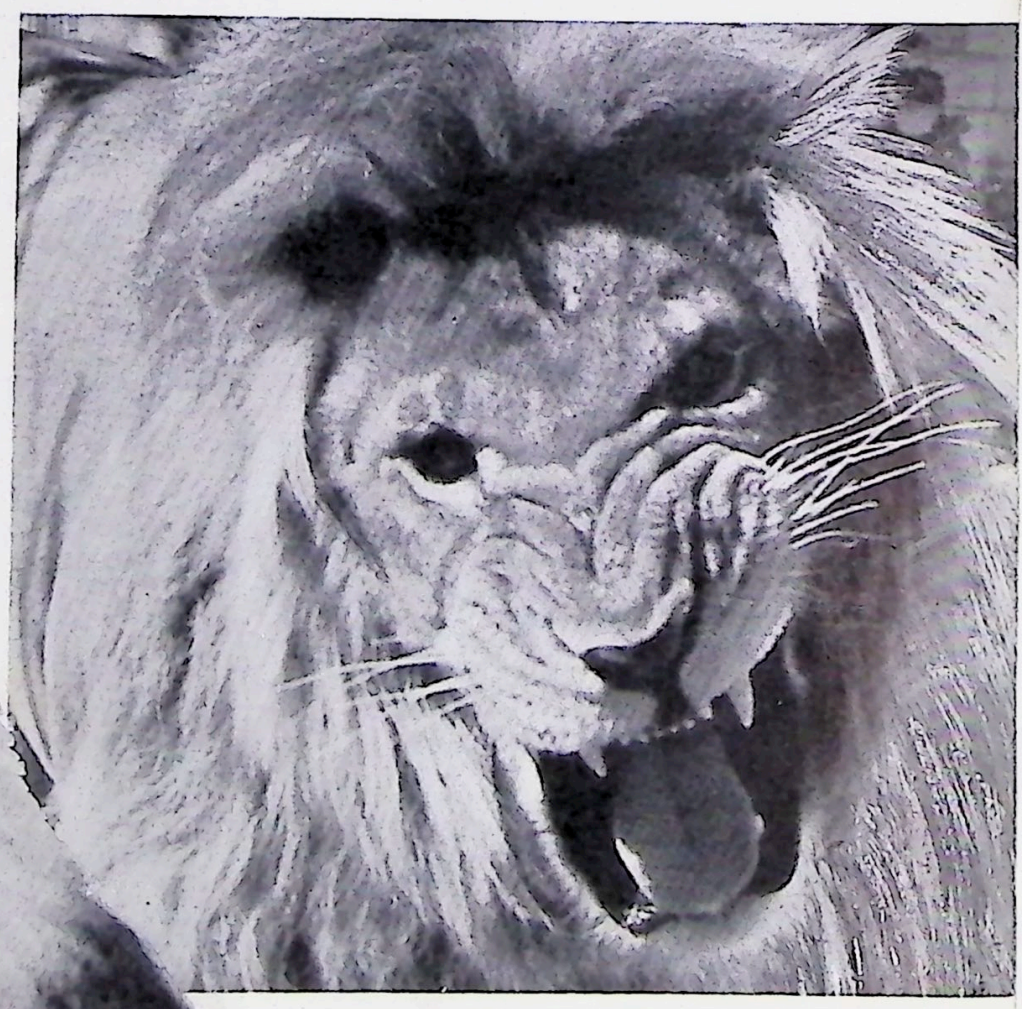


*Through modern techniques, rabbit fur, or coney, has been developed into the most satisfactory low-priced fur, for wearing qualities. Easily dyed, it is used extensively in imitation of beaver, chinchilla, muskrat, ermine and leopard.*



*Largely carnivorous in diet and of a bloodthirsty disposition, the marten inhabits wooded and rocky localities of the temperate and subtropical areas of the northern hemisphere. All species yield valuable fur, but those from the far north are the most esteemed, especially when caught in winter, since the fur is then longer and denser.*

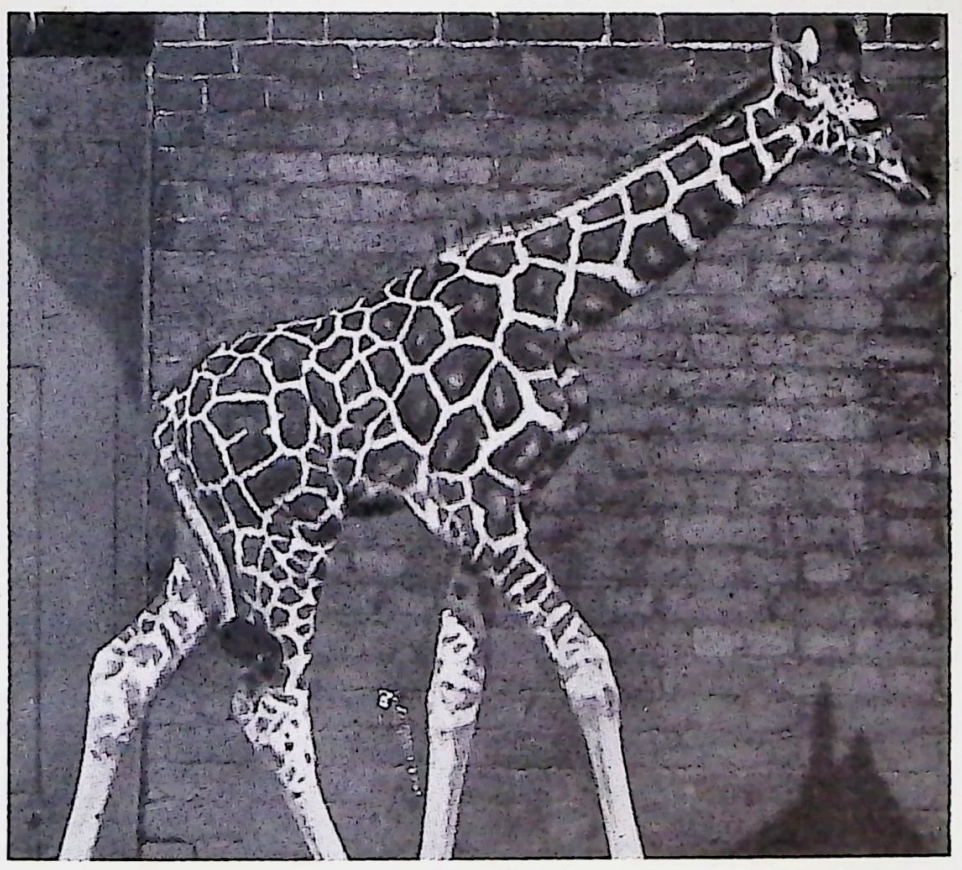
*Giant pandas, which originate in Tibet, are prized by zoos for their playful, clowning nature.*



*The nocturnal lion preys on buffalo, antelope, zebra and giraffe, bounding from ambush or stalking its victim. The part protective coloring plays and how jungle animals live together is seen in "Big Animals of Africa."*

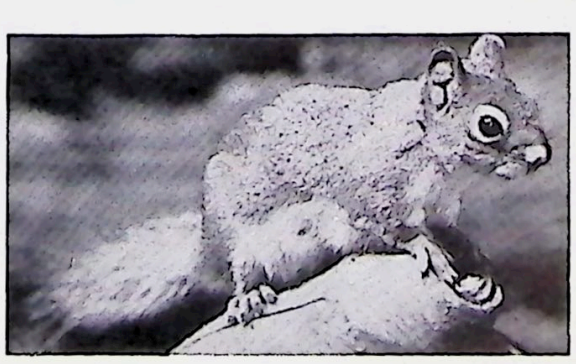
*Goats are ruminants, closely allied to sheep and usually easily distinguishable from them. Some hair sheep, however, look like goats except for the tail's direction — up in goats, down in sheep.*

*The cow is equipped with biting teeth for tearing off grass and flat, grinding teeth for chewing it. A tough upper gum and a rough tongue compensate for the lack of upper front teeth.*



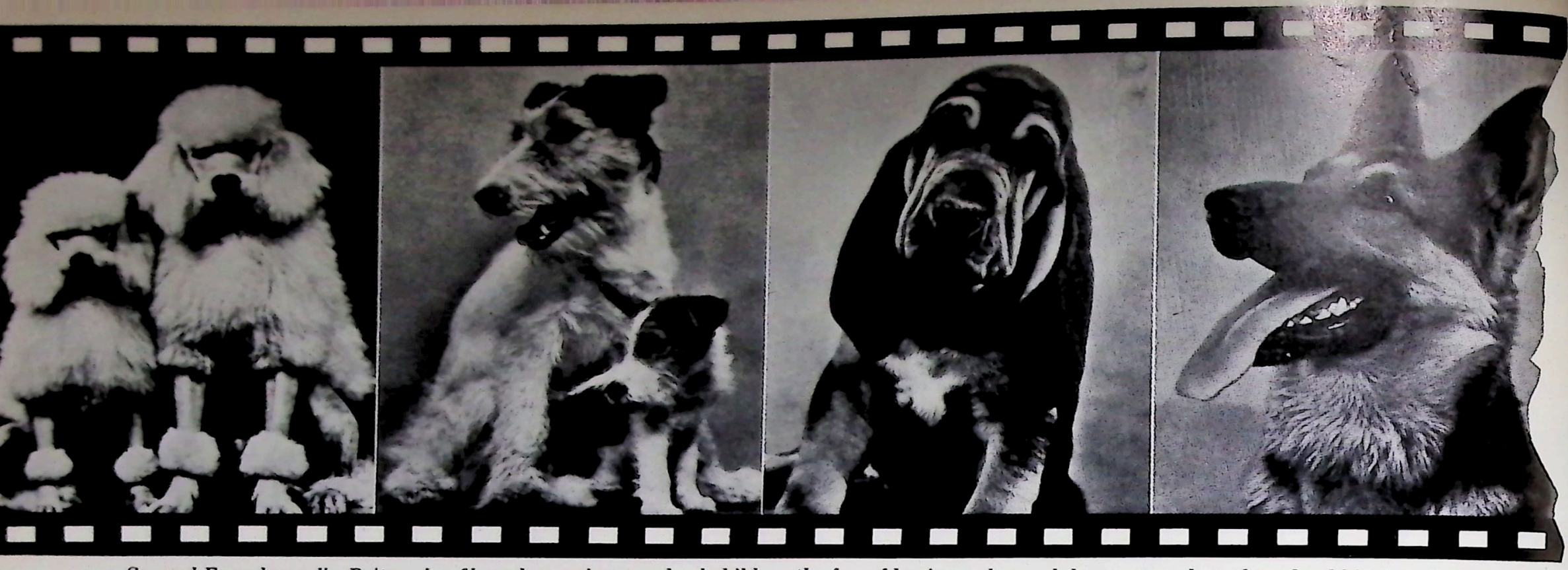
*Tallest of all mammals, giraffes reach 18 feet, 7 inches in height, which, coupled with their remarkable elastic tongues (up to a foot and a half in length), enable them to dine on tree leaves.*

*"Pride — The Saddle Horse" traces the development and training of a colt until he becomes a prize saddle horse, while "Palomino: The Golden Horse" teaches basic horsemanship.*



*The saucy squirrel, bright-eyed and bushy-tailed, roves the treetops of the tropical and temperate regions.*

*Despite the fact that they are marine mammals, swimming and diving easily and tirelessly, seals are fond of basking in the sun on sandy beaches, rocks or ice floes. They resort to the land or ice, often in immense numbers, to produce their annual single offspring.*



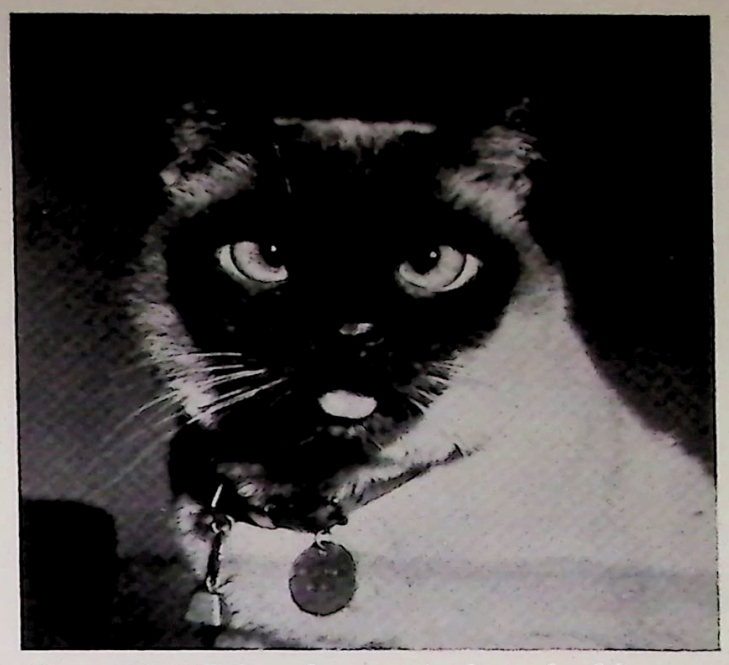
*Several Encyclopaedia Britannica films show primary school children the fun of having a dog and demonstrate how they should be handled, trained and cared for. The story of "Frank and His Dog" is set in happy family surroundings; "Care of Pets" teaches youngsters about birds and fish as well as dogs; "Shep—The Farm Dog" illustrates the life of a farm dog and "Tippy—The Town Dog" relates adventures of a city pet.*

*More than 30 breeds of dogs were used by the United States and other countries during World War II to aid sentries, serve as messengers, detect machine gun nests, act as pack and sled dogs and as first aid assistants.*

*Most of a dog's senses are much keener than a man's. In hearing tests, a dog responded from 26 yards to a command a man 6½ yards away could not hear, and a dog's nose is so sensitive that a man cannot conceive of the many odors it detects.*

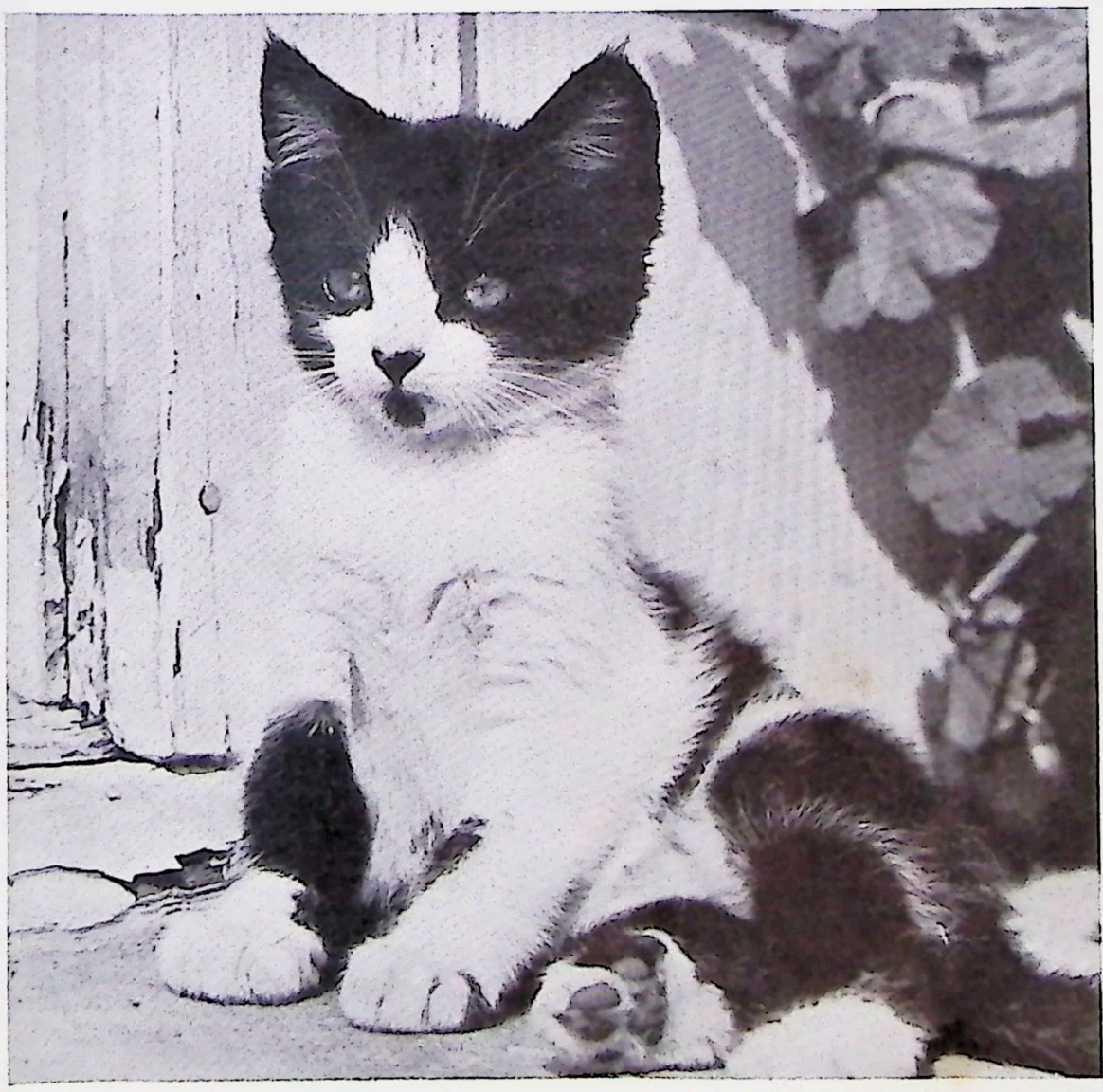
*The Pekingese originated in China before the 8th century. One of the most popular toy breeds, it has a pug-type head with a very short, flat nose.*

*The 5 main classes of dogs are based on use. Sporting dogs hunt by air scent; hounds hunt primarily by ground scent; terriers hunt by going to earth; working dogs serve as guards, guides and herders, and toy dogs act as companions.*



*About 3000 B.C., when agriculture had become well established, the Egyptians tamed cats to protect their grain. They proved so valuable they were later considered representatives of a god.*

*A study of the characteristics and habits of cats and kittens is made in the Encyclopaedia Britannica film, "Three Little Kittens," which follows the growth and development of kittens from birth until they are taken from their mother—as they play, climb, eat and learn to care for themselves.*



*Tame cats from Egypt were imported into Italy at an early date by Phoenician traders, long before the Christian era. Their progeny spread over Europe, more or less crossed with indigenous species, and were recorded in England as early as 936 A.D.*

*There are fewer breeds of domestic cats than there are of dogs. Apart from the division on the basis of pattern, domestic cats are divided into short-haired and long-haired groups.*

*The lower half of the beak of the California quail contains small, saw-like teeth. The quail, a variety of small poultry, builds its nest upon the ground. It is easily recognized by its black tuft, dashingly cocked forward.*

*The ostrich, largest of all birds, sometimes attains a height of 8 feet.*

# Birds are interesting

*Strong wings and sharp eyes enable some sea birds to spot fish from great height, swiftly plummet to the surface of the water and skillfully extract their prey with scarcely a splash.*

AN ENTIRE classroom can watch a variety of birds obtain food, build nests and raise their young at close range without startling a single one, through the patience and ingenuity of Encyclopaedia Britannica photographers. Films point up the characteristics shared by all birds, as well as underlining their differences and the practical reasons for them.

In the Encyclopaedia Britannica film, *Birds Are Interesting,* it is seen that birds differ greatly in the shape of their bills—the hooked bill of the hawk, suited to tearing his prey; the high curved bill of the chicken, well fitted for picking food off the ground; the duck's broad, flat bill, with which he scoops food from the water; the short, thick bill of the canary, a help in eating seeds; and the long, blunt bill of the willet, good for probing into soft sand for small seashore animals. The wings of birds also differ, depending on the amount and type of flying for which they are needed. Some birds have sharp taloned claws with which to grasp their prey; some have webbed feet for swimming, while others have weak feet, good only for perching.

Aquatic birds are peculiarly adapted to life on and near rivers, lakes and beaches, as is clearly depicted in the film, *Water Birds.* The long legs and neck of the scarlet flamingo are ideally suited for digging mollusks from the mud. The pelican, despite its clumsy appearance on the ground, flies gracefully, sometimes in V-formation. A flying pelican can suddenly plummet from the air into the water and come up with a fish, which it swallows whole. The two or three years it takes for the pelican to develop into an adult pass quickly on the screen as the eggs hatch, the naked young birds feed from their mother's throat, and are cared for and trained by their parents.

The migration of birds when winter comes is the theme of other Encyclopaedia Britannica films. *Birds in Winter* and *Migration of Birds* both cover this fascinating subject. Some birds travel in huge flocks and journey long distances; others, such as robins, migrate in a different way. Each bird works its way southward day by day, stopping to search for insects and worms. The problem for birds in winter is getting food, and birds which can find food in winter often do not migrate, but are permanent residents. The goldfinch eats the seeds of plants which are not likely to be covered by the winter snows; English sparrows and starlings eat a wide variety of foods, including scraps that people leave outdoors; and bird feeders offering grain, sunflower seeds and suet help many species through the winter.

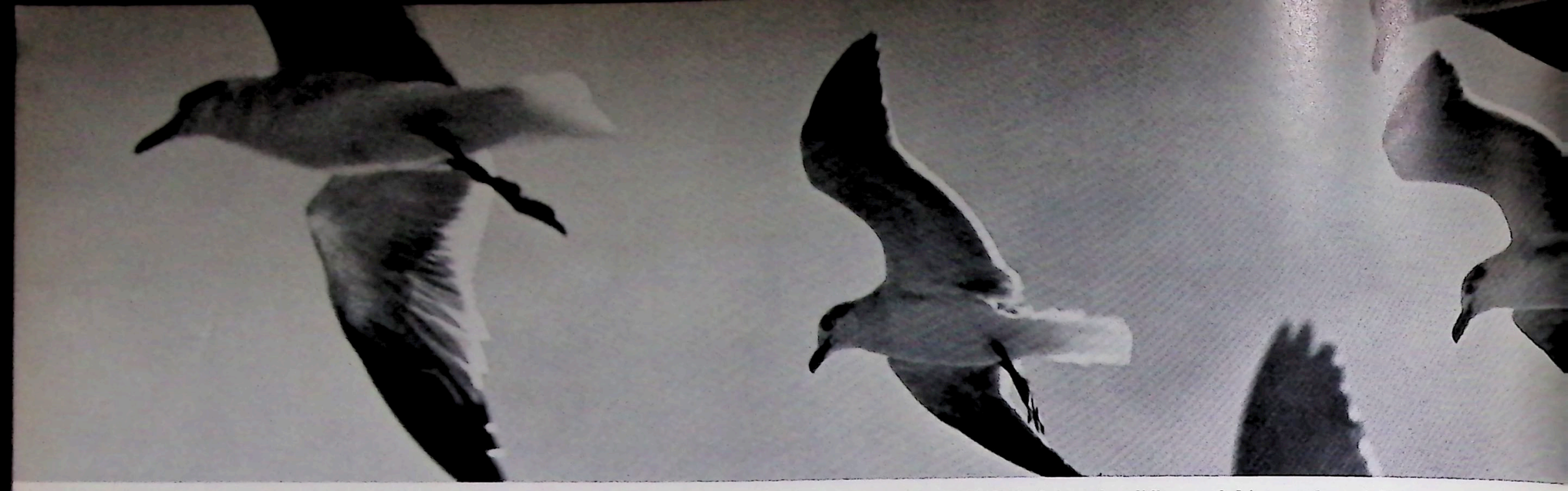
Fluffing up their feathers enables birds to keep warm during the winter and they can tolerate very cold weather as long as their food supply is adequate. When winter closes in, however, it may look as though all the birds are gone, but by means of the Encyclopaedia Britannica educational film, the student sees that there is a great deal of bird life remaining. ♦

*Encyclopaedia Britannica photographers capture birds on film in their native habitats. Their many hours of painstaking work create informative portrayals of the structure, life and growth of a large number of species. Through films, terms like protective coloration and migration become meaningful. In no other way can students gain so many fascinating facts and concepts in such a short time.*

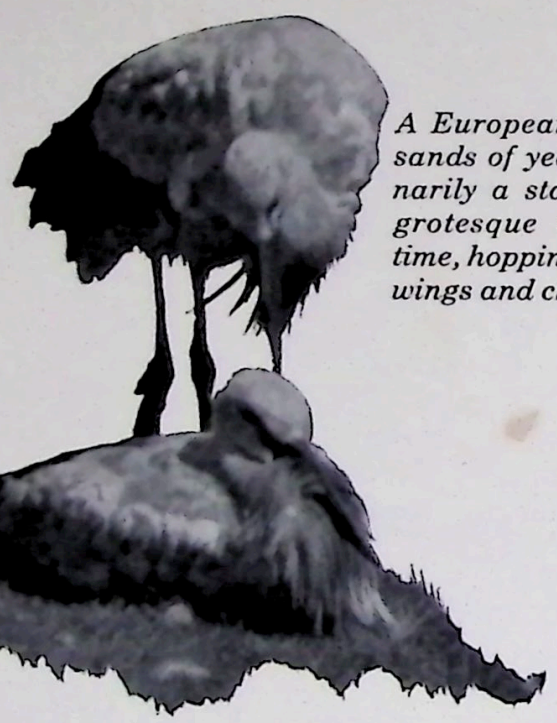
*Birds of prey are generally characterized by respectable size, somber plumage, powerful claws, formidable hooked beaks and keen eyes. Eagles, owls, hawks, buzzards, vultures, condors, and falcons are the best known species.*

*A bird's feathers, in addition to keeping it warm, may also serve a number of other purposes—protecting it from water, aiding flight, rendering it inconspicuous, appealing to the opposite sex, or providing a warm lining for a nest.*

*The feeding of nestlings is a full time job. A bird's diet varies with its species and ranges from the vegetarian to the carnivorous. Fruit, seeds, buds, leaves, small mammals, other birds, fish, mussels, slugs, insects, worms and nectar, all appear on the menu of one bird or another.*



*The film, "Water Birds," shows the different fishing styles of birds: a hovering osprey catches the fish in its talons; a swooping herring gull with its bill; a cormorant dives from the surface; a heron usually waits for a fish to swim past and a kingfisher makes a sudden plunge.*



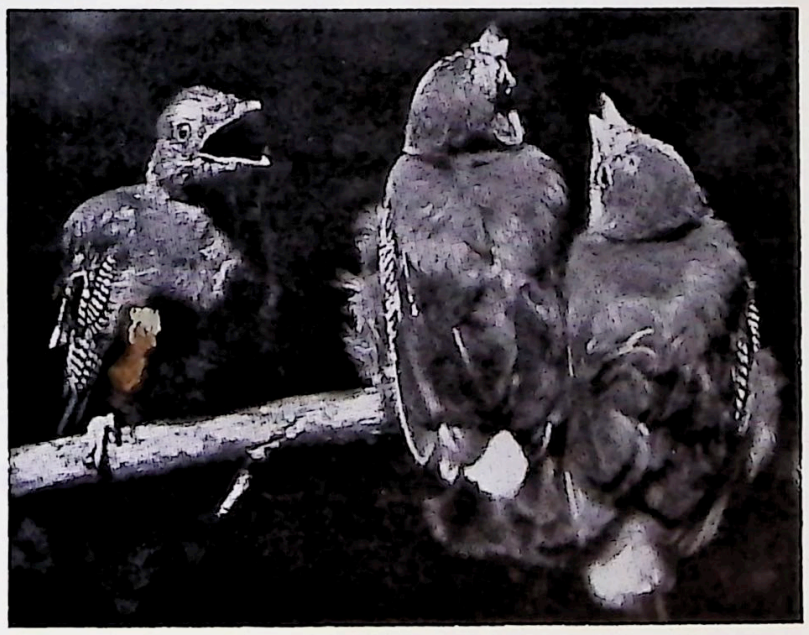
*A European resident for thousands of years, the stork, ordinarily a stately bird, performs grotesque dances at mating time, hopping about with spread wings and clattering mandibles.*

*Sea eagles range all continents except South America. One of the eight species, the bald eagle, is the national emblem of the United States. A mass of sticks atop a tall tree or rocky pinnacle within easy flight of sea, lake or stream, forms its eyrie. Its 1 to 3 eggs hatch in 35 days, both parents sharing incubation and care of the young, which take 4 years to mature.*

*Birds range in size from the small hummingbird weighing less than 2 grams, to the 300-pound ostrich. Because of the great value of its plumes, farms have been established where ostriches are regularly deprived of their ornamental feathers.*

*Some birds are solitary in their mode of life and others are more sociable. With many species sociability is at its lowest ebb during the breeding season, when flocks break up and settle in pairs.*

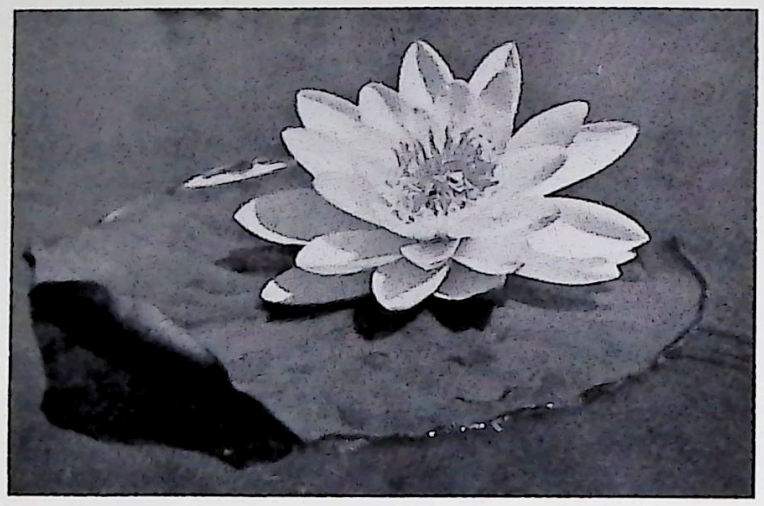
*A survey of bird behavior in such activities as nest building and food capture indicates that, in addition to instinct, imitation, simple trial and error experimenting and the establishment of simple association, there are instances of genuine intelligence, varying with the species.*



*The cockatoo is a species of parrot living in the Australian region, characterized by a crest of feathers which can be raised at will. Other types of parrots inhabit a wide area, mostly tropical. For centuries, parrots have attracted attention by their gaudy plumage and the readiness with which many of them repeat sounds, including words and phrases of human speech.*

*The name daisy, which is applied to many plants with showy rays, is derived from the Anglo-Saxon and means day's eye, an illusion to the appearance of the flower. It is perennial, abundant almost everywhere in Europe, and found in Asia Minor and North America.*

*Attention is riveted on the screen as the importance of flowers and plants in man's environment is graphically shown through the use of film. In just a few minutes, students are able to grasp exciting new concepts and understanding of plant life and growth.*



*Almost any floating plant with conspicuous flowers is known as a water-lily. An aquatic plant with thick, fleshy rootstocks embedded in the mud, it has shield-like leaves, and leafless flowerstalks terminated by a single white, rose, yellow or blue flower.*

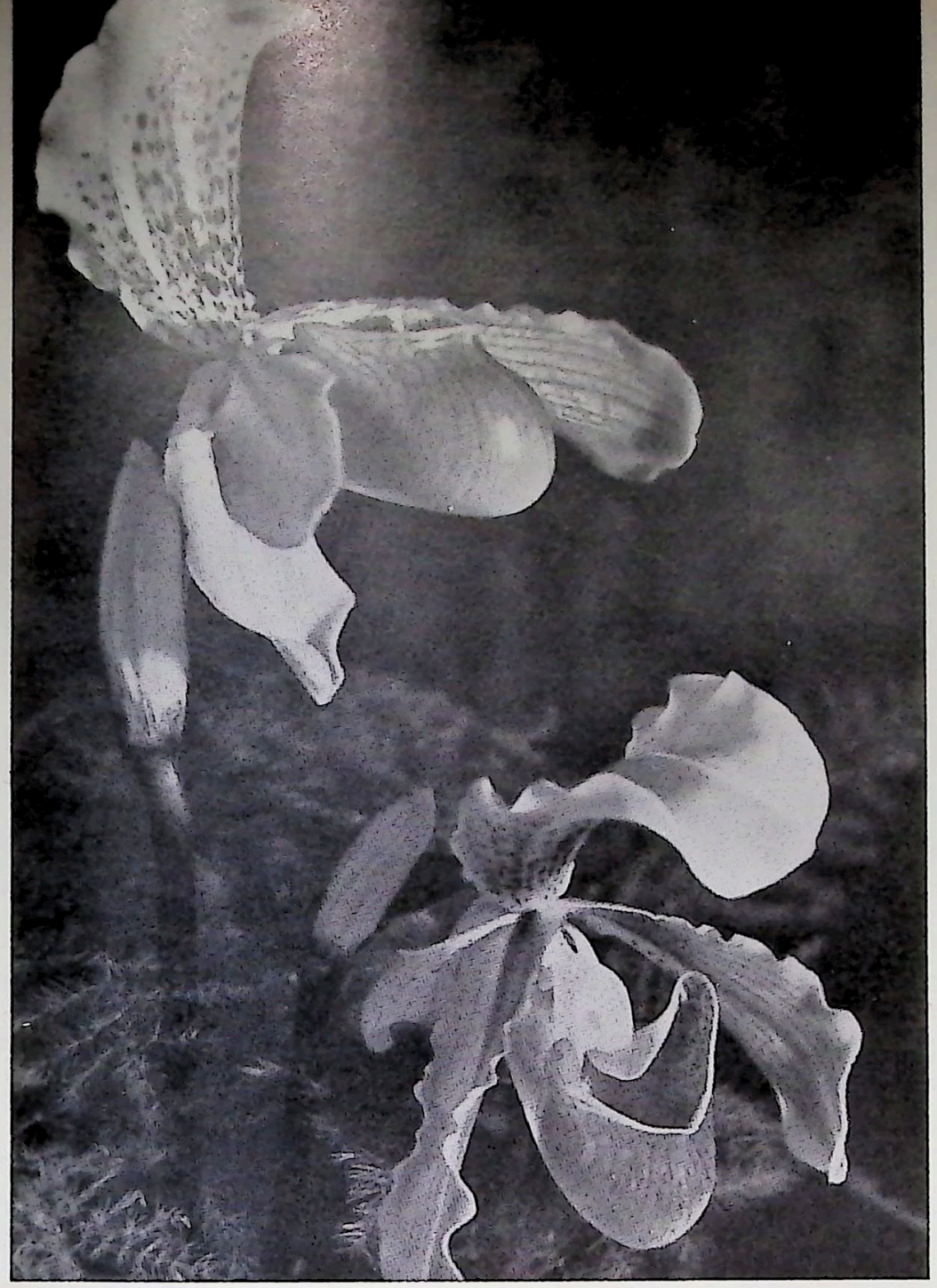
# learning about FLOWERS

THE beauty, function and growth of flowers and plants are strikingly and colorfully portrayed in Encyclopaedia Britannica films. Photography is uniquely able to indicate the structure and variety of plants and flowers and to familiarize the student with new species. It shows the interrelationship among plants, their natural environments and the animals and insects which are dependent on plants for their food.

Growth which actually takes several hours or even days is caught in a few seconds by the magic of time-lapse photography. All the drama of plant growth can thus be revealed in a manner far more vivid and comprehensible than watching the growth of an actual plant. The glorious unfoldment of buds of several common flowers of field and garden becomes an active, visible process with the camera's aid.

Plants are dependent for growth upon water, light, minerals, air and warmth. The film, *What Plants Need for Growth,* compares plants receiving all these necessities with those lacking any one or more of them and shows how plants react to unfavorable conditions with stunted or unhealthy growth, or no growth at all. The student sees identical seeds planted in two similar pots containing dry soil and observes that as only one of them is watered regularly, the other fails to show any signs of life. In the same film a covering placed over one half of a seed bed discloses that shaded plants are much smaller than those receiving sunlight and that the leaves of green plants always turn naturally toward the light. To

*A popular garden flower, the lily plant emerges from a scaly bulb, rather than a seed.*



*Fantastic flowers of almost unreal fairy-tale beauty bud from the ungainly greyish-green stumps of the orchid plant in a profusion of colors, shapes, sizes and fragrances. Numbering 40,000 different species, they grow all over the world with the exception of the polar regions, although 85 per cent of the species are found in the tropics or semi-tropics.*

*Lupine, of which there are some 200 varieties in far-flung areas of the world, has been cultivated in Egypt since ancient times. Its round, flat seeds are eaten after they have been steeped in water to remove their bitterness. In Mediterranean countries, lupine is cultivated for forage and soil enrichment as well as food.*

*The rose's beauty and fragrance have won it prominence in painting, architecture, music, literature; caused it to figure prominently in legend, customs, and religion; made it an ingredient of medicine, cookery, perfumery.*

*The fragrant peach blossom has heralded the arrival of spring in almost every part of the world for many centuries—as early as the 5th century B.C. in China.*

demonstrate the need for air, an experiment was performed with two tomato plants in tin cans. Drainage holes were drilled in one to eliminate excess water, which would displace needed air, and the photographed results showed that the plant with more air grew faster.

The complete cycle of growth indicates that the purpose of the flower is to produce seeds and a film on *Seed Dispersal* shows how nature provides for propagation. *Learning about Flowers* traces the growth of a bean pod, a pumpkin and an apple from their respective flowers and reveals how, from each mature fruit and vegetable, new seeds are obtained, so that the cycle of growth of the plant, flower, fruit and seed can be repeated.

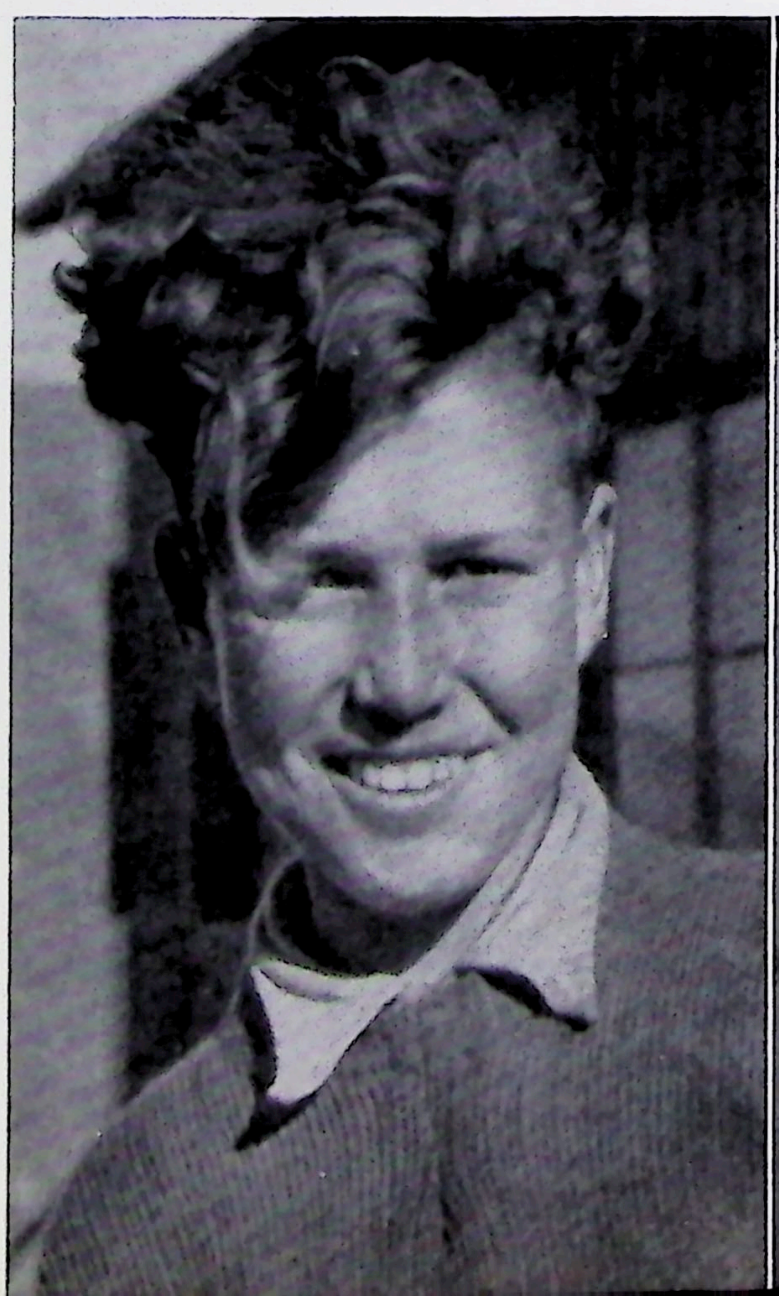
Special close-up lenses disclose many exciting discoveries about the structure of plants and flowers. They make it possible to see that the pussy willow is, in reality, a cluster of many tiny blossoms. The bud of an apple tree is found to contain both leaf and flower and the petals of the dogwood flower are not petals at all, but bud scales that grow larger and turn white.

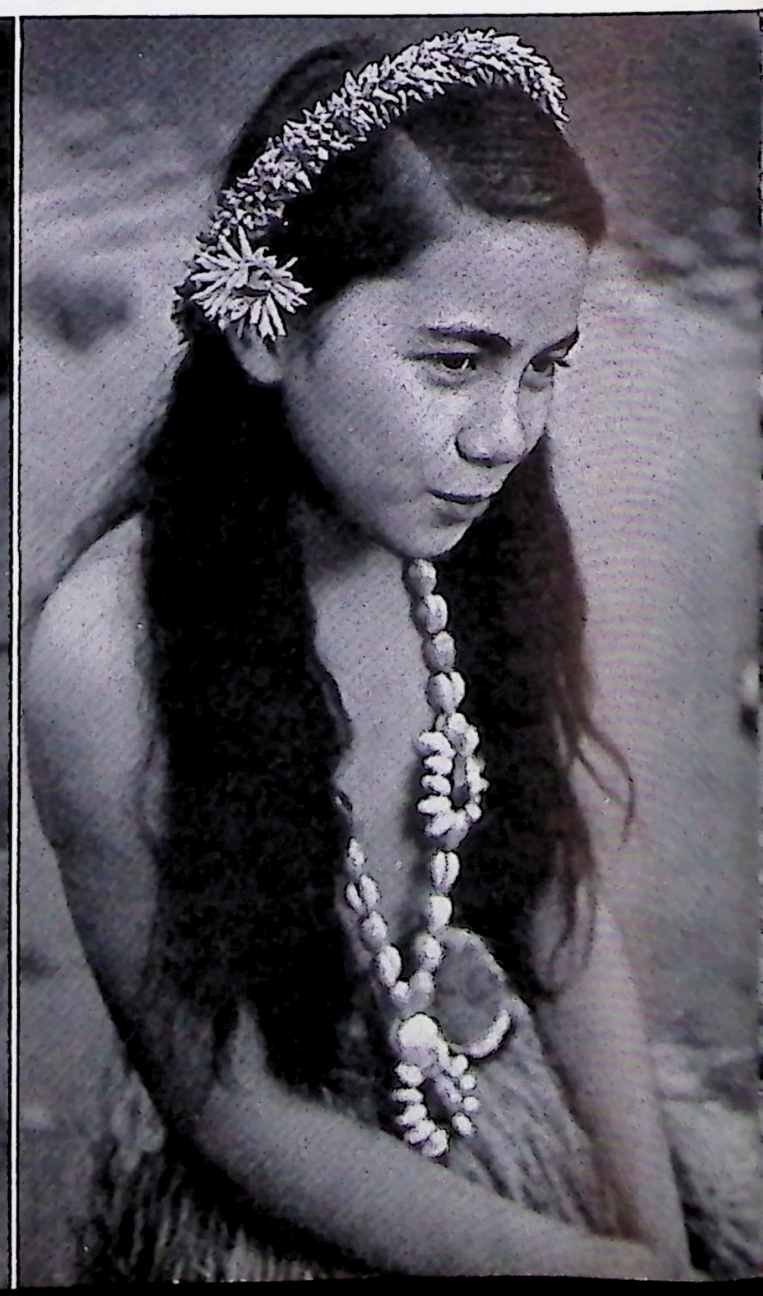
Time-lapse photography and microphotography help in explaining how water is transported throughout the plant, and the ways in which it is used. Osmotic action is shown in laboratory experiments, and special film techniques clarify the process involved in this complex phenomenon. Thus, aspects of plant life impossible to see in any other way, or only in extremely time-consuming ways, can be graphically observed in a few dramatic minutes on film. ♦

*Encyclopaedia Britannica films provide educational passports for delightful visits with Arabian, Chinese, Dutch, English, Eskimo, French-Canadian, French, German, Greek, Irish, Italian, Japanese, Mexican, Navajo, Norwegian, South Pacific Island, Spanish and Swiss children. Each film familiarizes pupils with the work, play, schooling and family life of youngsters of other cultures and brings out the fact that, although foreign children may differ in appearance, dress and custom, basically all children are pretty much alike despite cultural differences.*

# CHILDREN of many lands

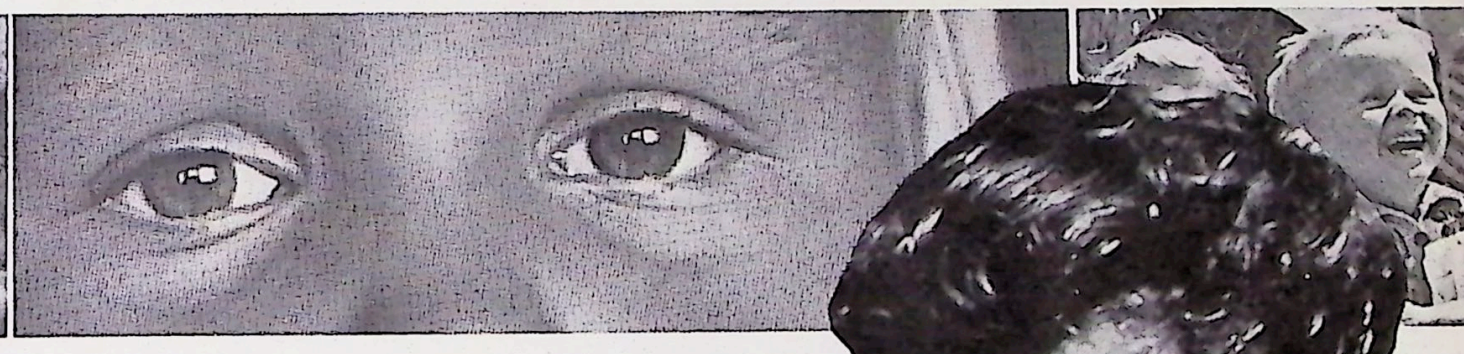
*Teachers are finding the popular series, "Children of Many Lands," a sure way to introduce classes to foreign life and to stimulate reading and creative expression. These films tell how people of different cultures meet the same basic problems.*





*In some lands, where food and warm clothes are scarce and toys are very few and primitive, childhood is not a happy time. At a very early age, many of the world's children must begin working long hours in the fields or in the home. In some countries, there is neither time nor oportunity for schooling and children grow up without the ability to read and write.*

*For almost 10 months of winter the Arctic, the land at the top of the world where trees never grow, lies fiercely cold. Protected by fur-lined parkas during that long, dark, bitter season, with the coming of spring, Eskimos load their goods and families on dog sleds and move from their winter camps to spring hunting grounds. The film "Eskimo Family," shows how they live in tents and bring their furs to the trading post to exchange them for supplies.*

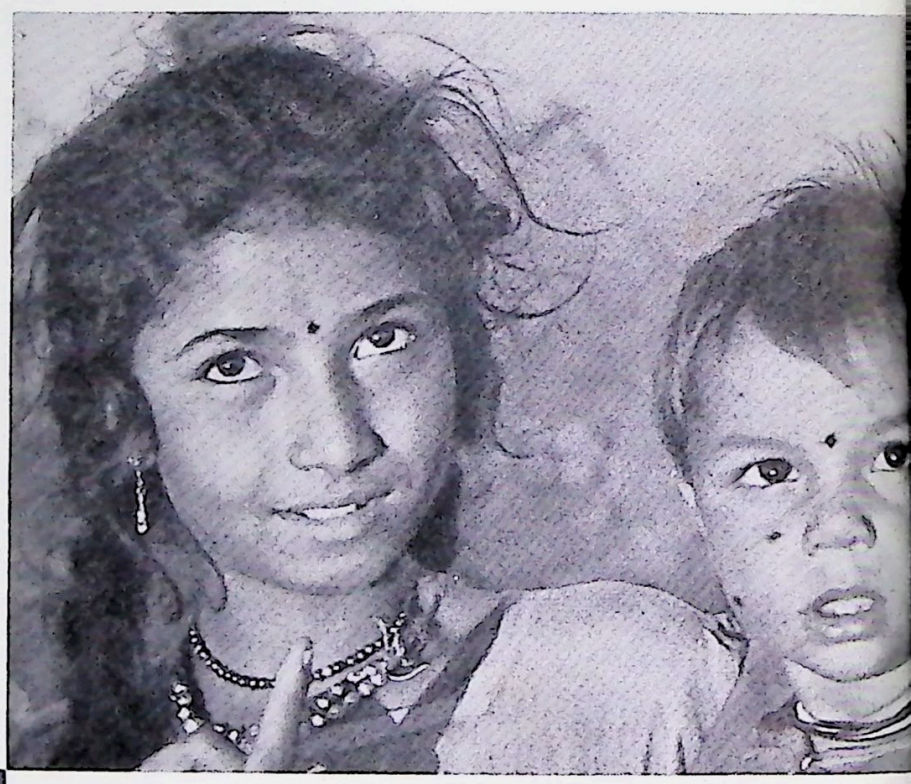


*Polynesia is made up of the eastern Pacific islands, from Hawaii south to New Zealand—from Easter Island west to Samoa. Although life has been much changed by the various foreign powers governing the islands, the economy is still based on fishing and agriculture.*

*Life in the primitive tribal cultures of Africa differs much from that of more advanced countries. In many parts of the African continent, parental training still substitutes for the schoolroom; goods are obtained by barter and sacrificial ceremonies are still enacted.*

*Arab life is generally organized into tribes, each under the control of a hereditary or elected sheikh. Within the tribe are sections with patrilineal descent, each headed by its own sheikh, subordinate to the tribal sheikh. The size of a tribe or section may fluctuate with the popularity and strength of its sheikh, as a strong and just man will attract families from other tribes into his unit.*

*An American Indian child in ceremonial dress, a sunlit youngster of Israel with a cake of soap that really lathers, or solemn-faced moppets from another land—such delightful children as these make wonderful teachers through the medium of Encyclopaedia Britannica films. The joys, sorrows, work and play of their daily lives, as they unreel before the eyes of fascinated school children, teach memorable social studies lessons that amplify and point up textbook material.*

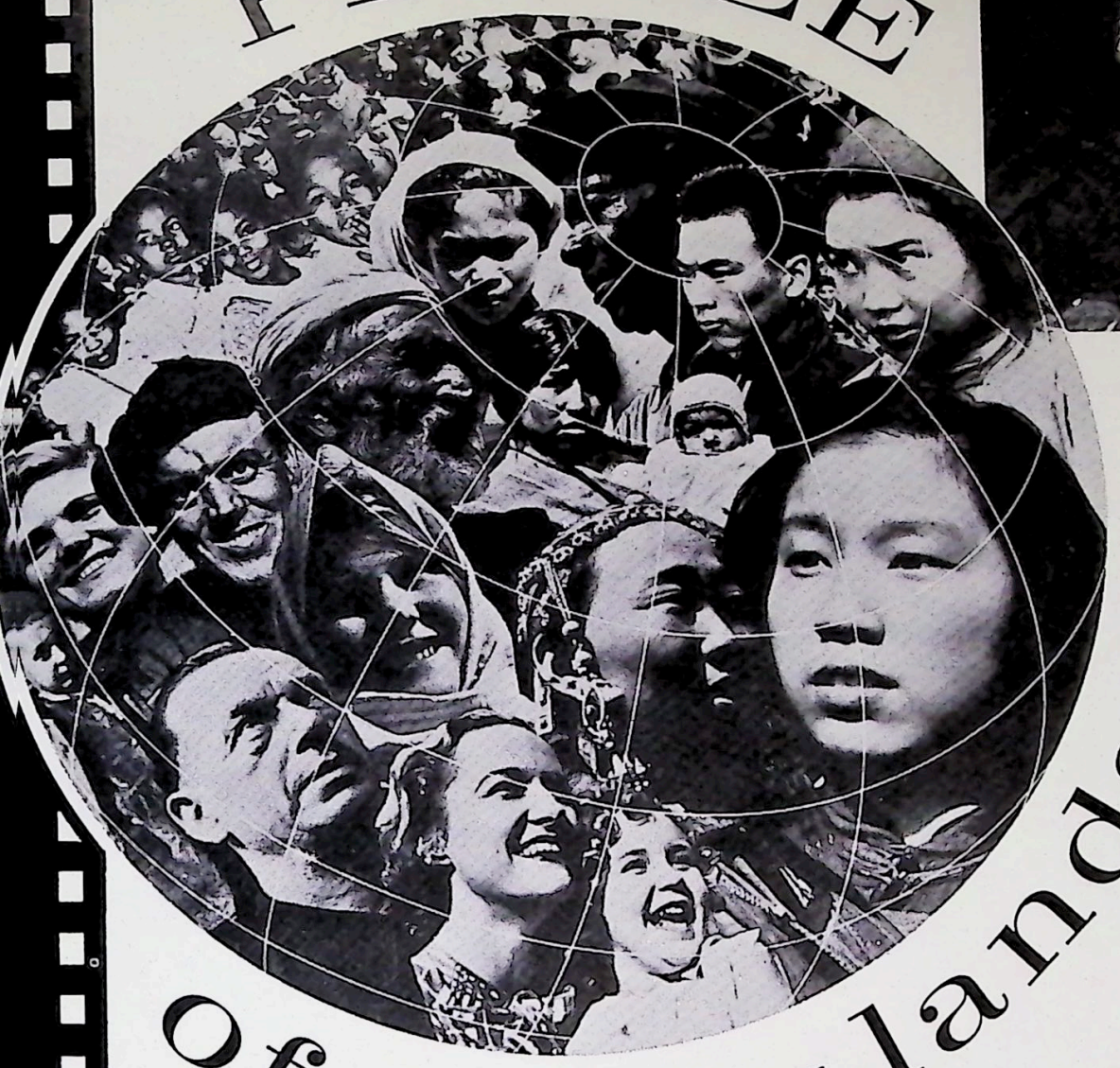


*In the household of India, the place of the child is secure and his need for love abundantly met in the big joint family, where there is always an adult ear available to listen and sympathize. In India, where child welfare has received a new impetus in recent years, the child is still the most important reason for society and all its customs.*

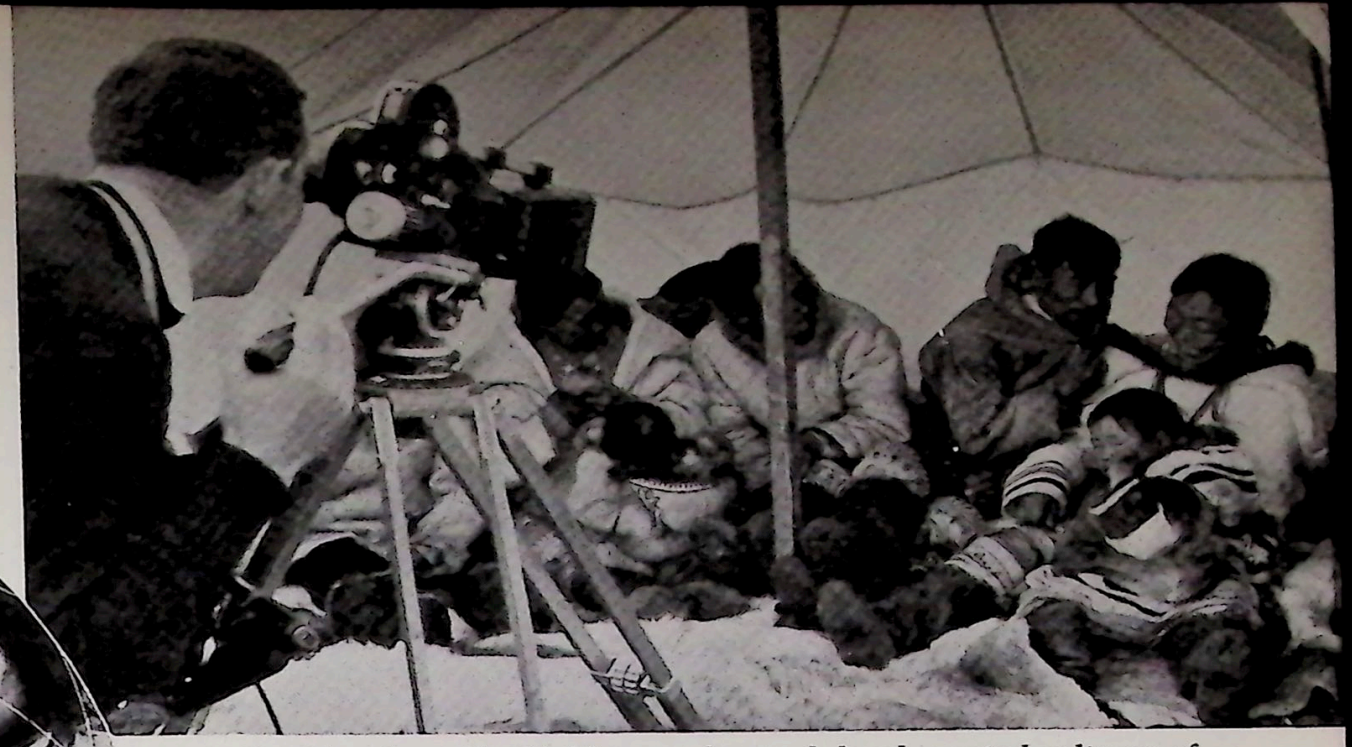
*Spain is a land of lovely senoritas, art treasures and sun-drenched beauty—a land that sired some of the world's most intrepid explorers—men who brought their culture and language to the new world.*

*Many Encyclopaedia Britannica films depict the lives of American children—on the farm, in the city.*

# PEOPLE



# of many lands



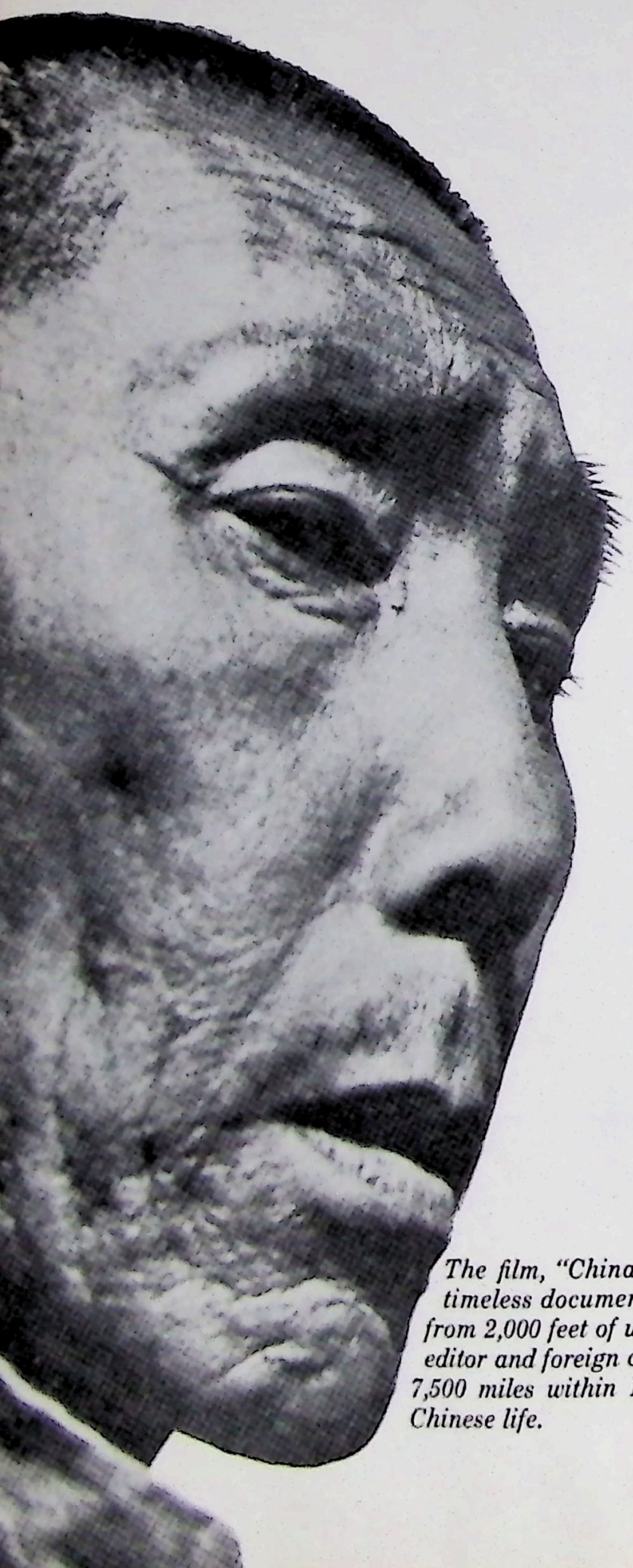
*Ranging from the highly complex and deeply rooted cultures of Europe to the contrasting primitive life of the Arctic as depicted in "Eskimo Family," Encyclopaedia Britannica Films offer wide coverage of the world's peoples, photographed in vibrant color. Each series—African Neighbors, Asiatic Neighbors, Australian and Pacific Neighbors, European Neighbors, Northern Neighbors and Southern Neighbors—provides from 2 to 20 films on individual countries or areas of these regions, with an extensive series on the United States completing the world picture.*

*India is a teeming nation, characterized by tremendous contrasts: wealth on the one hand, poverty on the other; the gem-like beauty of a Taj Mahal and the starkness of a backward village. A nation both ancient and modern, it is emerging from a cocoon of obsolete methods and tradition into a modern industrial civilization.*

*The film, "Bali Today," shows the luxuriant beauty of the tiny volcanic island, which is echoed in intricate metallic ornamental work, fine pottery, and colorful hand-loomed fabrics.*

*In Afghanistan, tribal law, hospitality and the vendetta are rules of life. Very much a soldier, the Afghan has great endurance, is frequently lawless, fanatical, avaricious and a hard bargainer due to poverty, but his character is lightened by a sense of humor and a ready wit.*

*Most Africans of Kenya are pagan, but Mohammedanism flourishes in coastal, urban and northern communities, and there is a large Christian community. Prosperity depends on agriculture. Extensive pasture lands render Kenya self-supporting in all animal products and an export trade in wool, hides and dairy products was begun prior to World War II.*



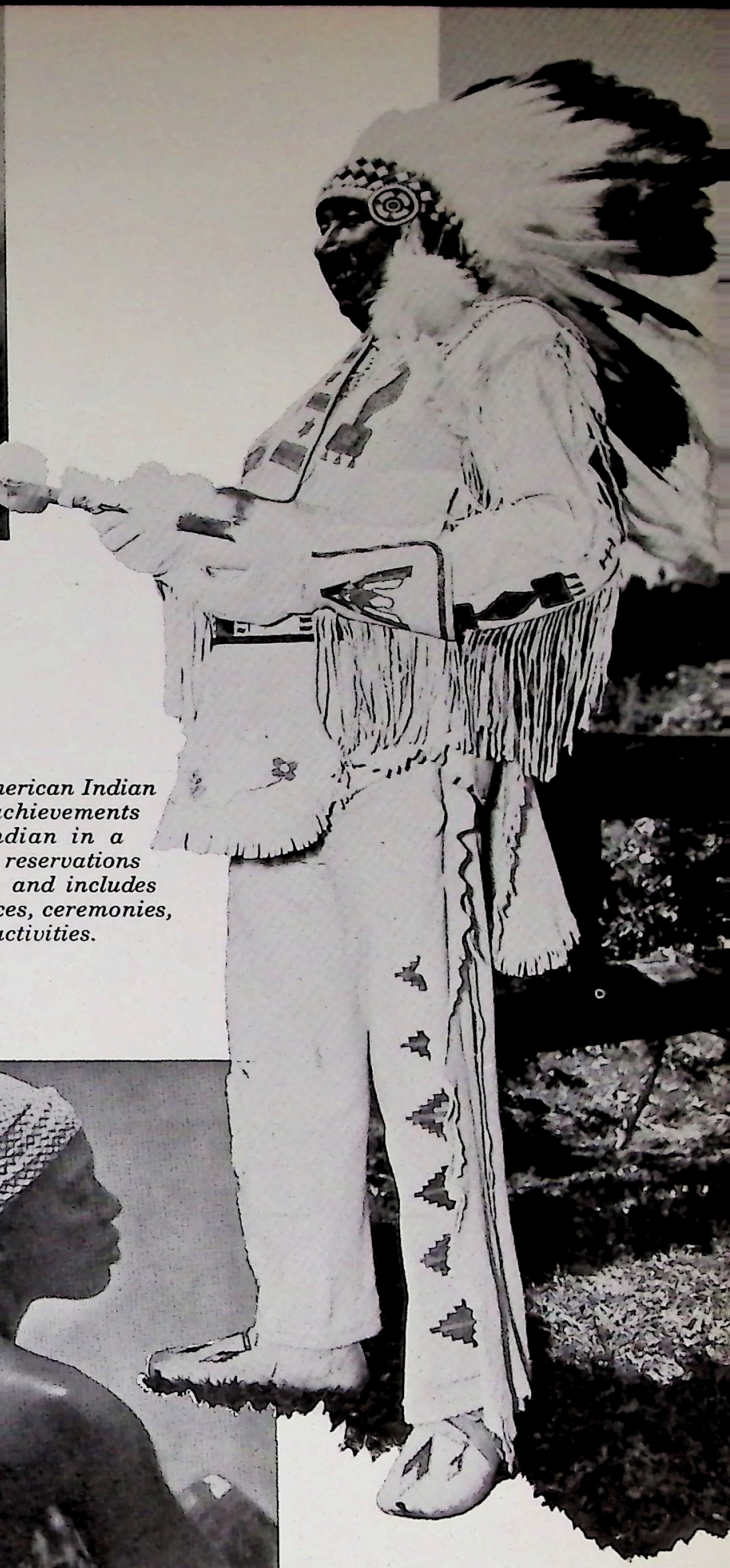
*In Greece, time is frozen in architectural form, dating from a great ancient culture and spanning the centuries. From the colorfully garbed peasant to the modern urbanite, the energy of the present is devoted to efforts to regain a worthy place in world commerce with shipping, fishing, fruits, tobacco products and marble as the chief assets.*

*A favorite European playground, Austria offers vacationers the magnificence of rugged Alps; the peace of lush, cool valleys; picturesque remains of ruined castles; inspiring and entertaining festivals, including the world renowned Salzburg Music Festival; and that proud citadel of European culture, the lovely old capital city of Vienna.*

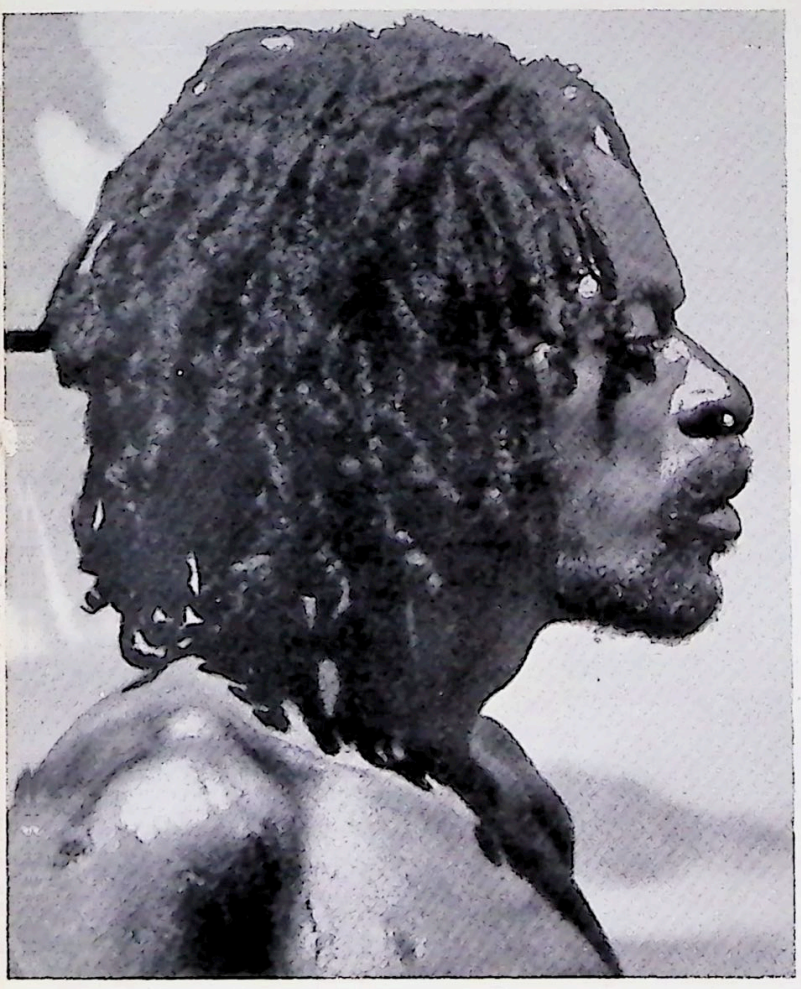
*The film, "China Under Communism," an exciting and timeless documentary of an awakening giant, was taken from 2,000 feet of uncensored color film recorded by author, editor and foreign correspondent John Strohm, who traveled 7,500 miles within Red China to photograph all phases of Chinese life.*

*The excitement and flavor of the bazaar as the center of manufacturing and trading is revealed in the Encyclopaedia Britannica film, "Arabian Bazaar." It is at the bazaar that the desert dwellers and city Arabs exchange goods and services, news and gossip, and enjoy a cup of coffee with friends.*

*A pretty German girl displays the bridal dress of the Black Forest area. Such elaborate costumes are highly prized in Europe, and are handed down within the family. They are reserved for such special occasions as weddings, holidays and festivals, although in a few regions native dress is still worn daily.*



*A series of films on the American Indian documents present day achievements and problems of the Indian in a variety of situations, from reservations to city relocation centers, and includes historic background, dances, ceremonies, hunting and other tribal activities.*



*Of diverse culture — there are more than 60 Papuan languages — the Papuan natives of New Guinea build houses on piles in some areas — immense communal dwellings between 500 and 700 feet in length.*

*The closeness of the relationship between mother and child is enhanced in many parts of the world by an almost constant physical contact, developing a warm sense of security in the child which is often lacking in more civilized cultures.*

*In a brief but unparalleled span of 30 years, the 13th century Mongols overran Asia and Europe, from the Yellow Sea to the Baltic and Adriatic. As a result of constant and far-reaching movement to obtain pasturage, they became horsemen and when these migrations brought them into conflict with other peoples, they developed into a warlike race.*

*"A Trip to the Moon" reveals the magnificence of its various formations. Combining photography with astronomy began in 1850, thus greatly simplifying the study of lunar formations.*

# Exploring the UNIVERSE

## ASTRONOMY

THE vastness of the universe and the complexity of its motion are unforgettably brought to the screen through special cinematic techniques by Encyclopaedia Britannica Films. The classroom film, *Exploring the Universe,* enables the student to see that, although most of the earth's surface has been mapped, exploration and mapping of the heavens is just beginning, and it explains the principles governing the use of refracting and reflecting telescopes—the primary tools for astronomical exploration.

The stars and clusters of the galaxy in which the earth is located are skillfully photographed to illustrate their movements in relation to each other and as part of a great galaxy. The fascinating theory of the expanding universe is demonstrated and a visual representation of an imaginary journey outside this galaxy provides students with a dramatic view of its appearance from out of space, where its central disk shape is seen with stars rotating about its center. Around this galaxy, numerous other galaxies move many miles per second with respect to each other; at the same time, myriads of stars slowly circulate within each galaxy. On the camera's return journey to earth, the motion picture screen reveals how this galaxy rotates, how the planets of the solar system revolve around the sun and finally, how the earth turns majestically on its axis.

Another astronomy film, *The Earth in Motion,* portrays man's planet as an astronomical body, explains its relation to the sun, and demonstrates its motion. It presents evidence of the earth's spherical shape, its axis rotation, its revolution about the sun, and the inclination of its axis. This film provides simulated observation of the earth from the stratosphere, of earth and stars in motion, and of the earth's orbit, explaining the causes of night and day and of seasons.

With the classroom film, *The Moon,* teachers are able to show how its gravitational pull causes the earth's tides; to clarify reasons for its phases, and explain lunar and solar eclipses. Animated drawings and moving models symbolize motions of the moon in its orbit around the earth, and movement with the earth around the sun.

*The Solar Family* makes an introductory study of the planets – their evolution, motions, sizes and satellites. It describes, through the use of animated drawings, the evolution of the solar system according to planetesimal hypothesis, and traces the real and apparent motions of the planets. It reveals special phenomena pertaining to certain planets, and shows the planetoids, Halley's comet and the movement of the solar system.

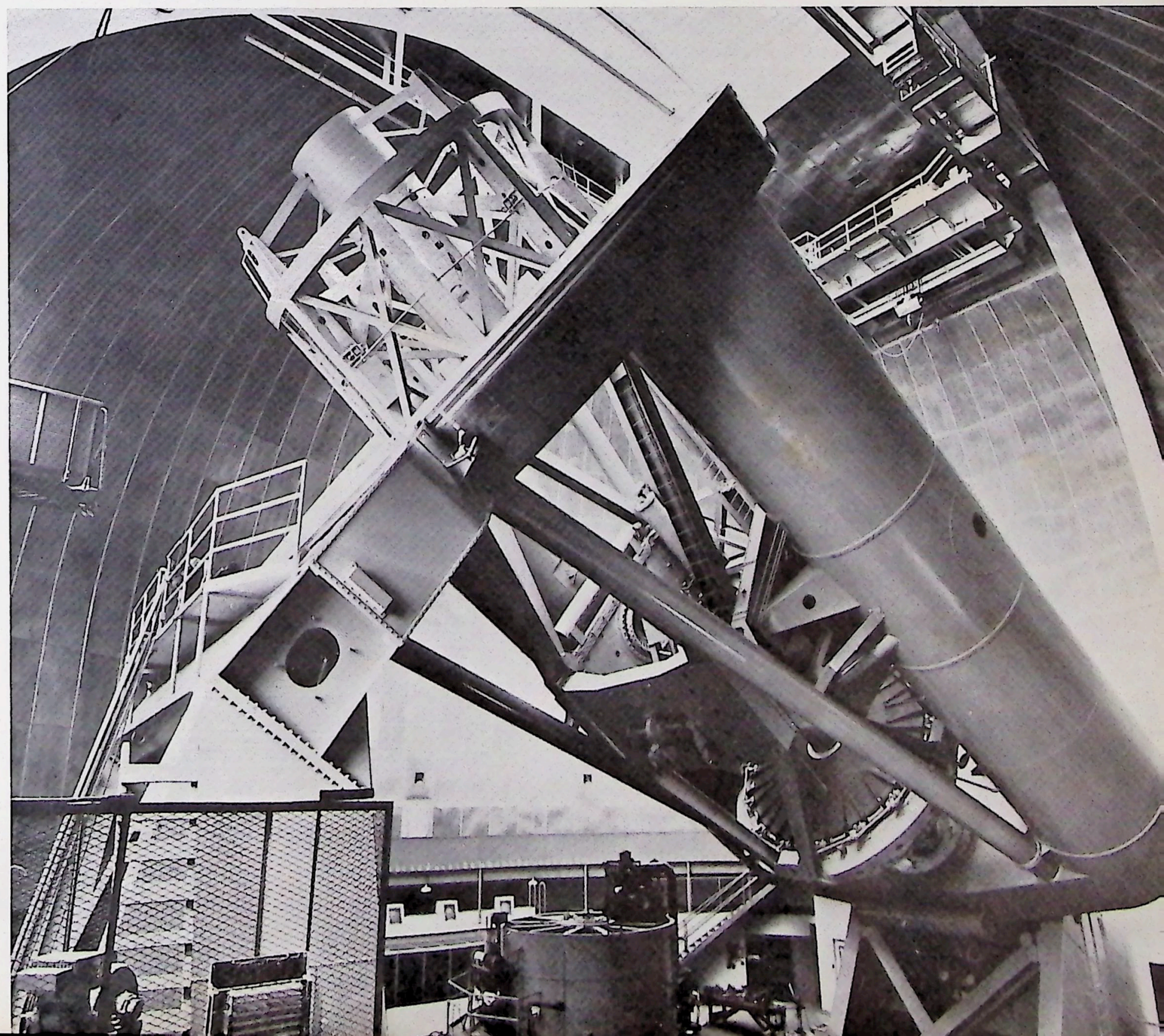
*Exploring the Night Sky, A Trip to the Moon, Planets In Orbit, Stars and Star Systems* and other Encyclopaedia Britannica astronomy films, bring the observatory into the classroom and demonstrate once again the necessity of motion pictures for teaching every subject in this modern age. ♦

*Mars, the fourth planet in order of distance from the sun, appears through the earth's atmosphere as a reddish star. Its two moons, Deimos and Phobos, are named for the horses of the Roman war god, Mars.*

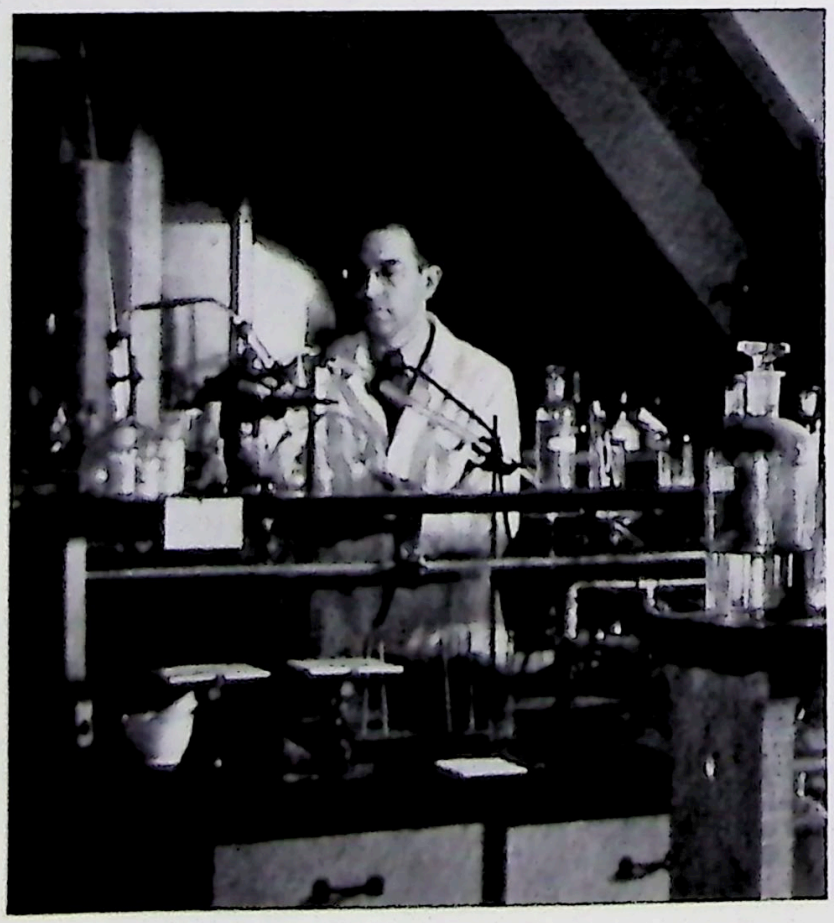
*The instructional film, "The Solar Family," shows that Mars is one of the few heavenly bodies with a solid surface like the earth's, although considerably colder than the earth.*

*Telescopes aid study of the surfaces of the moon and planets.*

*Palomar Observatory houses the Hale and Schmidt telescopes. "The Story of Palomar" demonstrates how the 200-inch Hale reflector telescope, the world's largest, is used to photograph celestial bodies.*

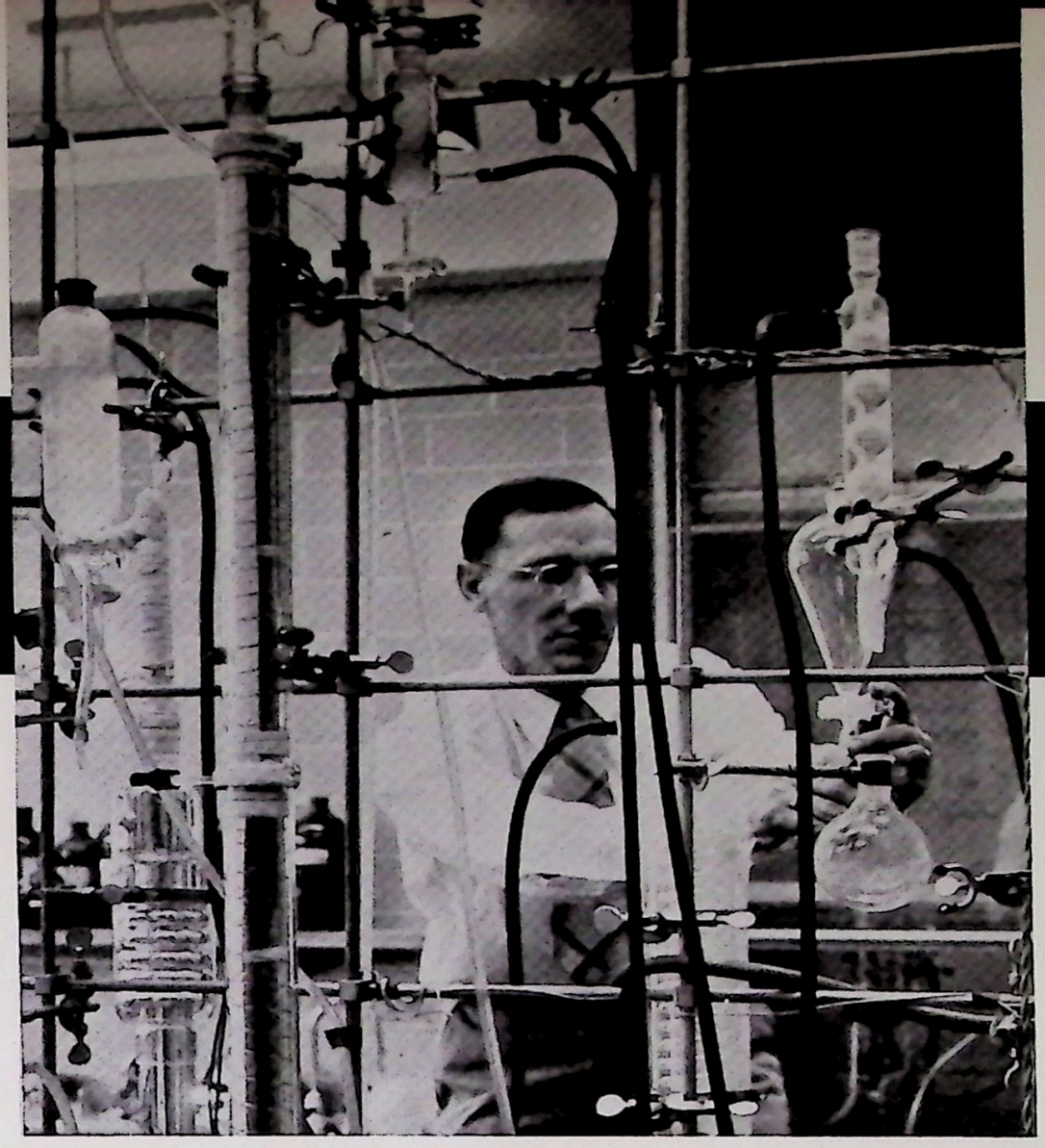


*Teaching before the camera, even in a specially built studio-classroom, presents a variety of problems unknown to the regular classroom teacher, Dr. John F. Baxter discovered during the filming of Encyclopaedia Britannica's chemistry course. Not only must each experiment work, but it must work on a split second schedule and be presented so that the entire process can be completely and clearly caught by the camera.*



*Many traits needed for careers in chemistry are characteristic of women: conscientiousness, meticulosity, neatness and a capacity for observation, attention to fine detail and teamwork. Women are not only qualified for lab work, but also for other aspects of the chemical field—teaching, library work, technical writing, and administration.*

# Complete Course in introductory CHEMISTRY



*The laboratory has become extremely complex since Lavoisier almost single-handedly revolutionized the chemical world in the late 18th century by formulating the law of conservation of matter—matter cannot create itself or disappear, but can only change its form. Substances which seem to disappear when heated, he proved, are actually converted into gases.*

A MAJOR break-through in the teaching of chemistry has recently been achieved by the world's largest producer-distributor of classroom motion pictures, Encyclopaedia Britannica Films. The 160 half-hour lectures and demonstrations are given by Dr. John F. Baxter, who was selected by the American Chemical Society for the role, and were produced in a studio built at the University of Florida, where Dr. Baxter teaches.

The unique series is aimed at the hundreds of American high schools with either no laboratories or inadequate ones, and is also intended to relieve the shortage of equipment and teachers, which has been progressively becoming more acute. It is estimated that college enrollments will double on a national scale by 1970. High school enrollments will likewise increase, although at a somewhat slower pace. Substituting films for laboratory work means savings in lab space, equipment, chemicals and utilities. Even more important, by offering uniformly expert teaching on film, chemistry teachers are enabled to teach more students more effectively.

A committee of experts called for drastic revision of the chemistry teaching program in New York City's schools recently, declaring it short of modern, accurate textbooks and limited by crowded and obsolete laboratories. They stressed the insufficient and inefficient use of visual aids and of scientific reports in newspapers and magazines, and insufficient pay for science graduates entering high school teaching. The report, however, commended New York's chemistry teachers for efforts to "present the subject in enlightening and stimulating fashion, in spite of handicaps."

Although Encyclopaedia Britannica's elementary chemistry film for high school or beginning college chemistry classes is no substitute for adequately trained and paid teachers, it can be used by the best teachers as a tool for increasing their effectiveness and, where adequate teaching is not available, as a framework which a less than expert teacher can follow. With hundreds of potential American scientists lost every year for lack of teachers and facilities, the filmed course fills a vital gap in this intensely scientific age.

The chemistry course on film is economical, compared to the outlay a school has to make to equip a thirty-student laboratory and pay a teacher for just one year. The life of the filmed course, which comes in either black and white or color, or a combination of the two, is generally ten years, and can be used to teach an unlimited number of students.

A most important aspect of the Encyclopaedia Britannica Films' research was to determine whether students were "short-changed" by substituting films for actual lab work. Figures compiled to date indicate that students actually learn more with the films than by working in a lab. Students like the film series because they do not have to search for chemicals or wait long periods to see final results of experiments and because they receive explanations of what they observe at the time they see it.

After using the films for a year, a Georgia teacher reported that her students were "aware of the advantages of the films, but only one who has had extensive graduate training in chemistry can fully appreciate the deep concepts that are gently, correctly and concretely introduced at this grade level. Above average students receive excellent college preparation and a true insight into chemistry. It is very satisfying for their long term plans, since the knowledge acquired is both broad and deep." It was also found that low-intelligence groups made as much gain as did the average groups in the traditionally taught classes.

Classes also benefit by Dr. Baxter's outstanding experience in teaching and his superior professional training, as well as by the opportunity to observe experiments impossible in a crowded classroom because of lack of time and equipment. The film course gives a modern theoretical approach to chemistry—a structural and quantitative viewpoint as opposed to descriptive chemistry. It is actually a college chemistry course, taught on a high school level, and thus allows an easy transition to college chemistry.

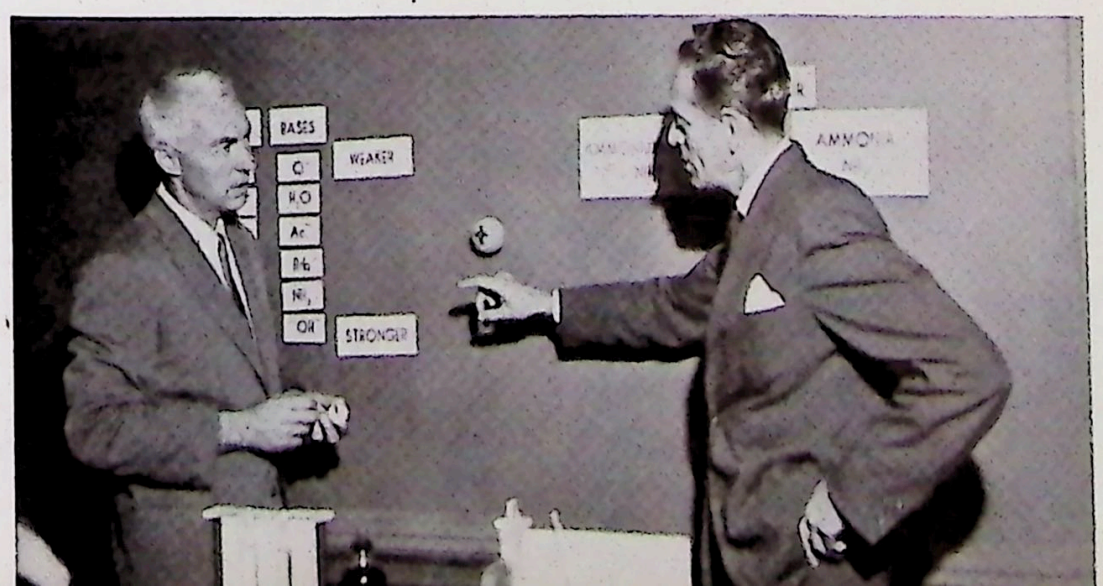
Animated drawings show molecular action possible only through films and visitations to industrial plants are better and more efficiently done. The rapid pace of the film course forces the teacher to make more efficient use of his time. Details such as roll call and collecting papers must be quickly taken care of to allow a full period of teaching. The student also must learn to use his time wisely, make scientific observations and master good note-taking habits. Class absences are reduced and attention is good.

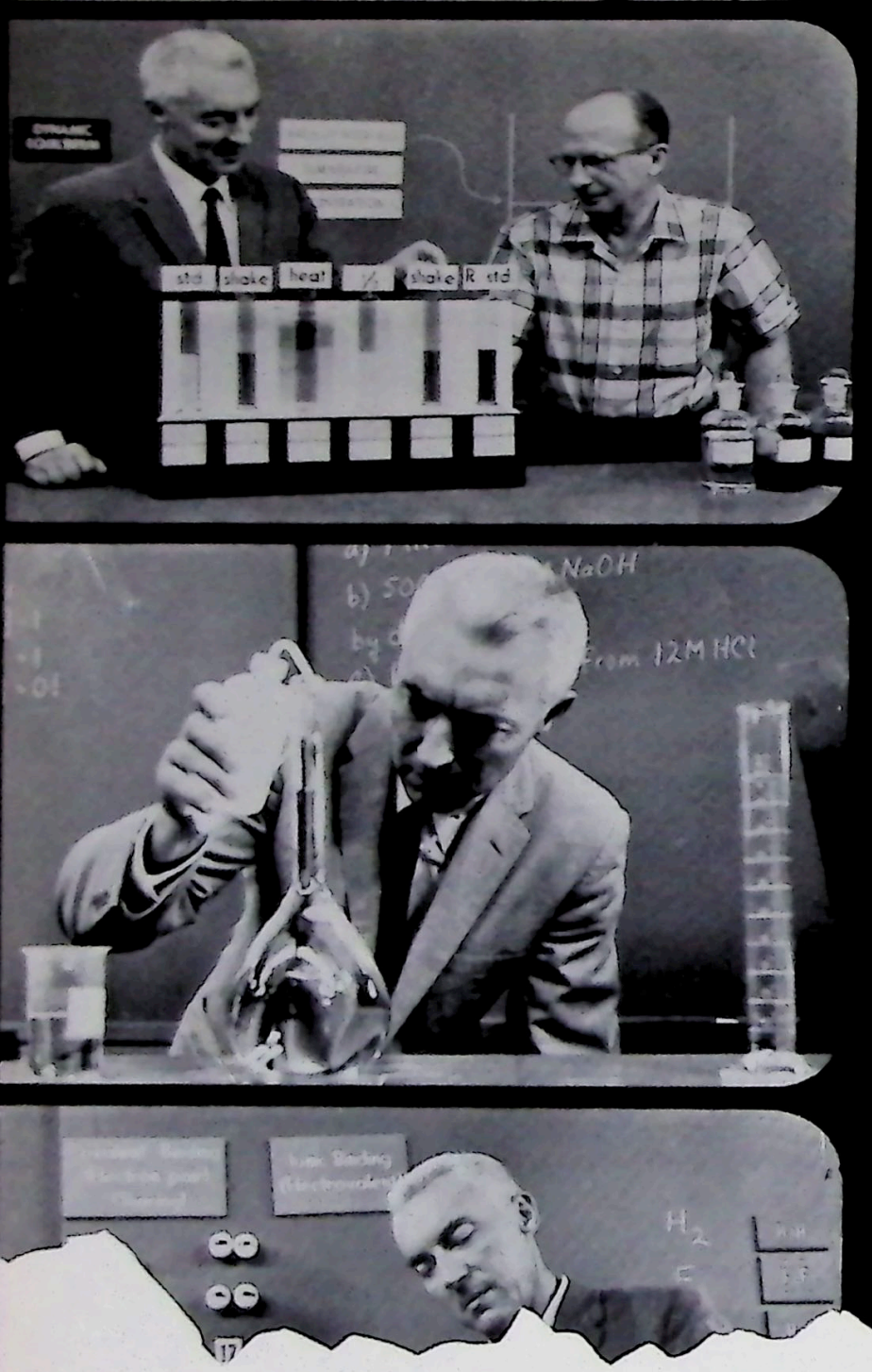
In addition to the complete introductory chemistry course on film, Encyclopaedia Britannica has also produced a variety of other ten and eleven minute films on the subject of chemistry—*Catalysis, Chemistry and a Changing World, Colloids, Electrochemistry, Molecular Theory of Matter, Oxidation and Reduction* and others.

Just as chemistry is a vital adjunct to a modern industrialized society, so is the teaching of chemistry by the most modern and efficient means—and evidence constantly indicates that for education at its best, the most advanced audio-visual material is a necessity.

Says Dr. John C. Bailar, Jr., President of the American Chemical Society, "The unusually rapid accumulation of knowledge during the past several years has given the chemist an understanding of the structure and composition of substances at the molecular, atomic and sub-atomic levels, and an ability to explain the behavior of chemical species far beyond anything that was possible for previous generations of teachers. It is our belief that this course makes available, in one instructional tool, a new approach to the teaching of modern chemistry in the secondary school." ♦

*Maurice B. Mitchell, President of Encyclopaedia Britannica Films, visits Dr. Baxter in his classroom-studio. As a result of Mr. Mitchell's far-sightedness and dedication to making audio-visual education as informative, understandable and interesting as possible, his company's films are always enthusiastically received by both teachers and students.*



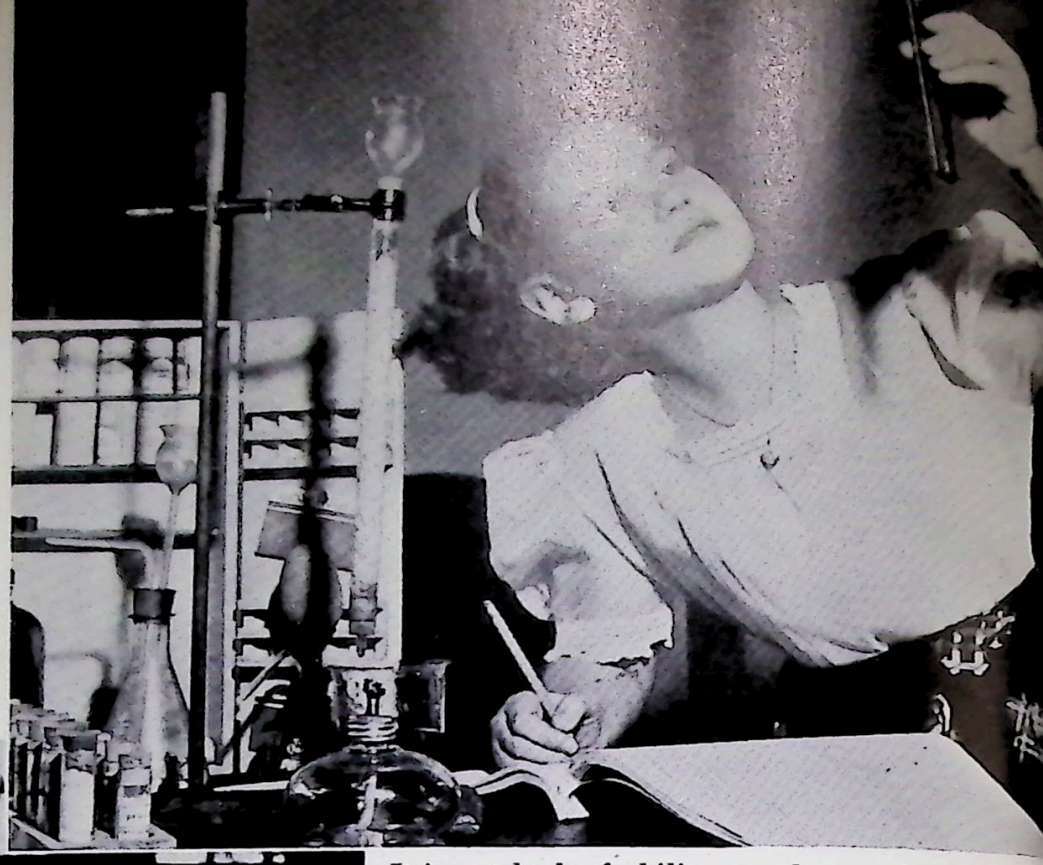




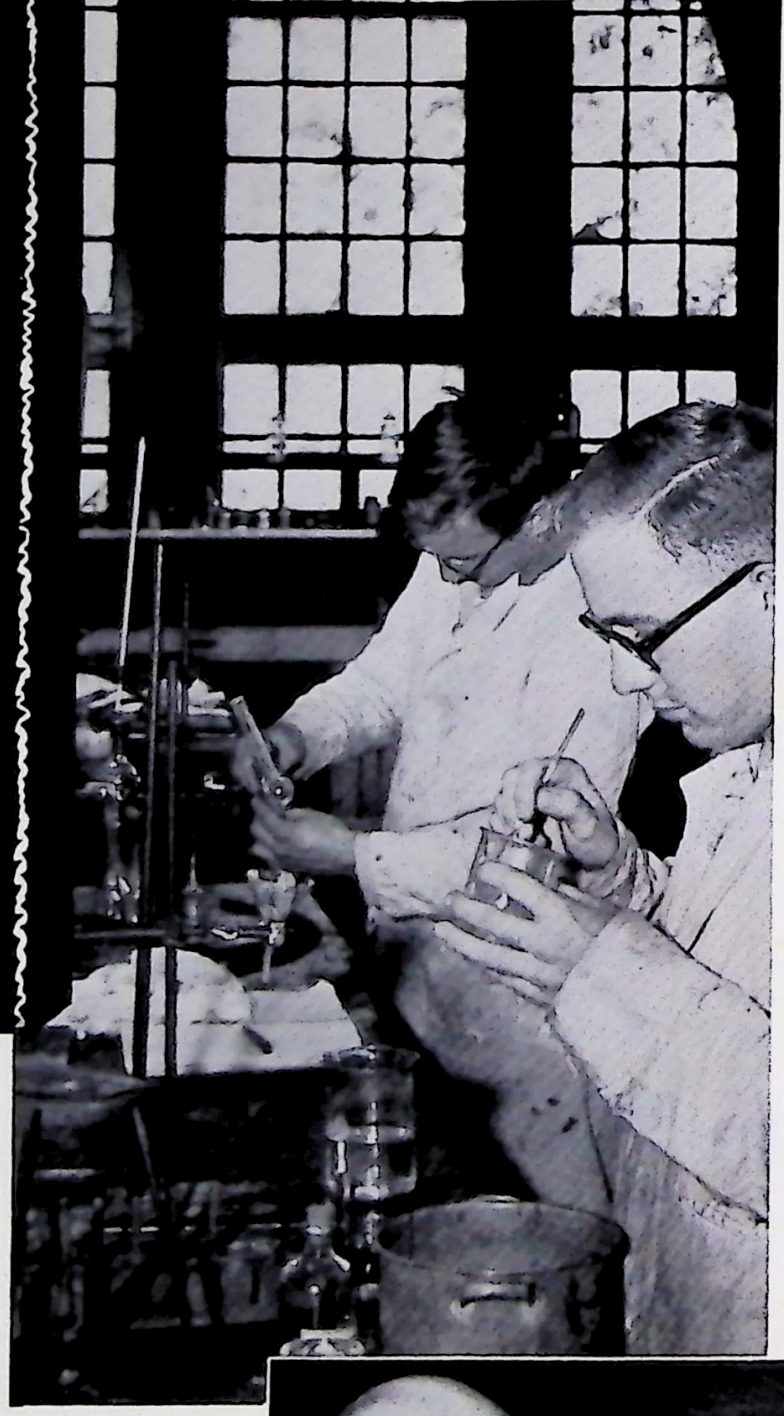




*The film course is amplified and varied in a number of ways: among the 160 lessons are a group of special films to provide teachers with certain options and flexibility of use; students' and instructors' manuals supplement the film material and Dr. Baxter makes use of animated diagrams, models, demonstrations and blackboards, to clarify and illustrate his lectures.*

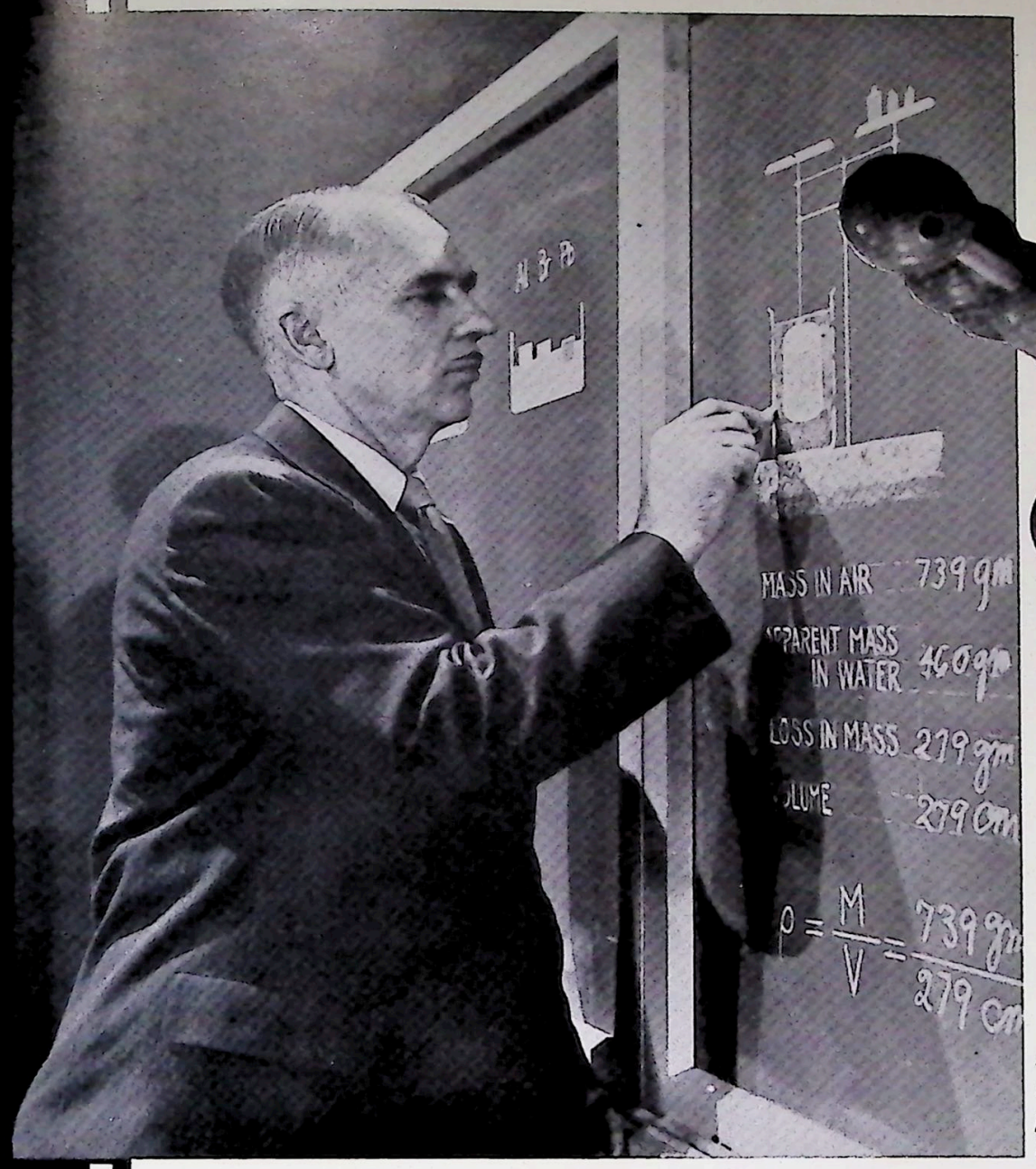


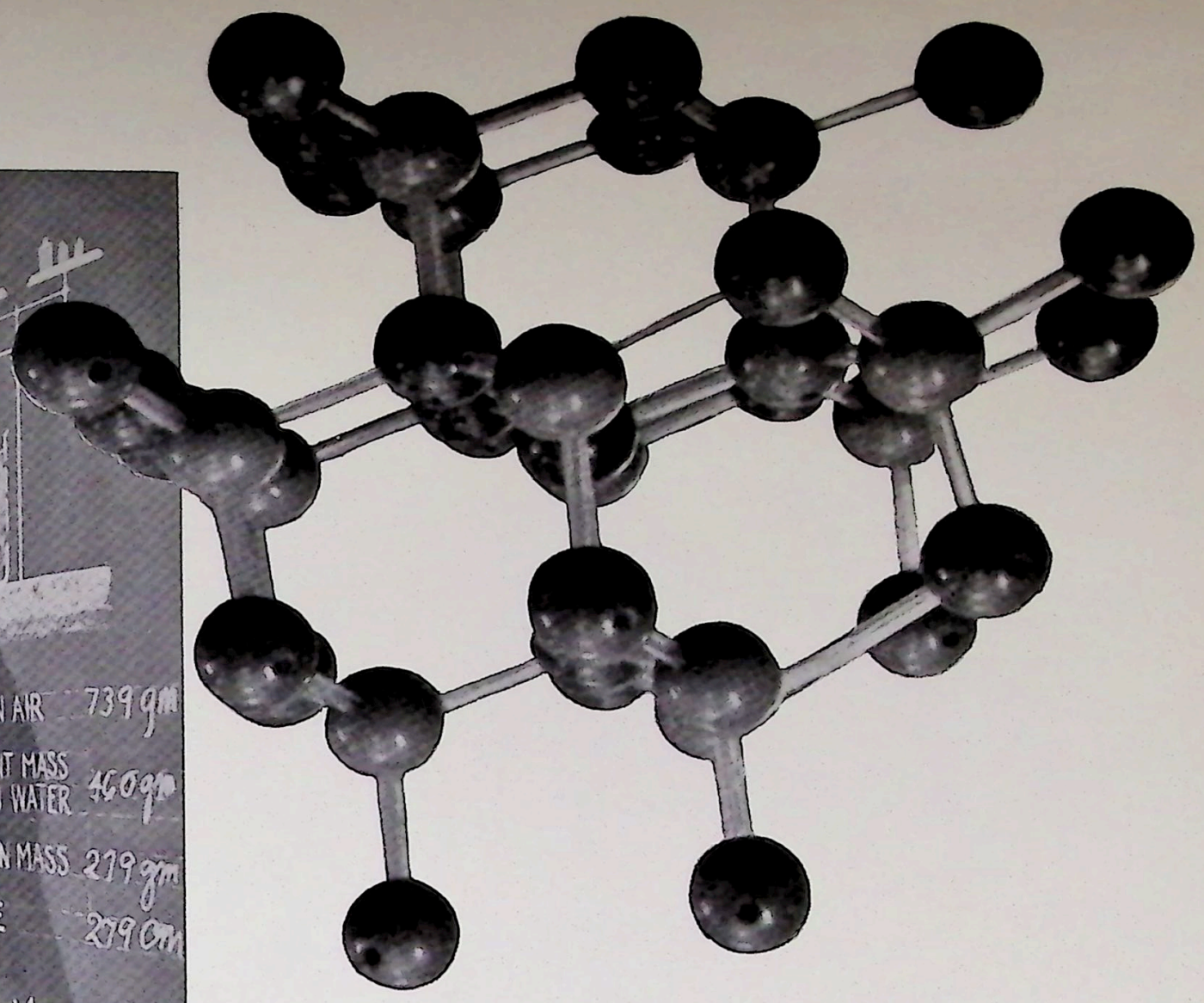
*It is not lack of ability or other qualifications that keep many girls from becoming chemists, according to authorities, but need of career guidance, especially at the high school level. It is also felt that more women chemists and chemical engineers would provide the answer to the problem of manpower shortages in these fields.*



*Research training, which begins in college, matures in laboratories of chemical companies spending millions to discover and develop new products. Research is an expensive gamble because the great majority of the 50,000 new compounds developed by chemists every year never get beyond the lab. Winnings in such gambles, however, are incalculable and may result in vast profits and extensive new industries.*

*At the Washington announcement meeting following completion of the chemistry film series, Dr. James R. Killian, Jr. (right) special consultant to the President for Science and Technology, accepted film copies from Dr. Baxter as Dr. John C. Bailar, Jr., President of the American Chemical Society, offered congratulations. Said Dr. Baxter, "Our chemistry course is designed to encourage students to think and come away with a broad, yet thorough, understanding of chemistry as a science."*

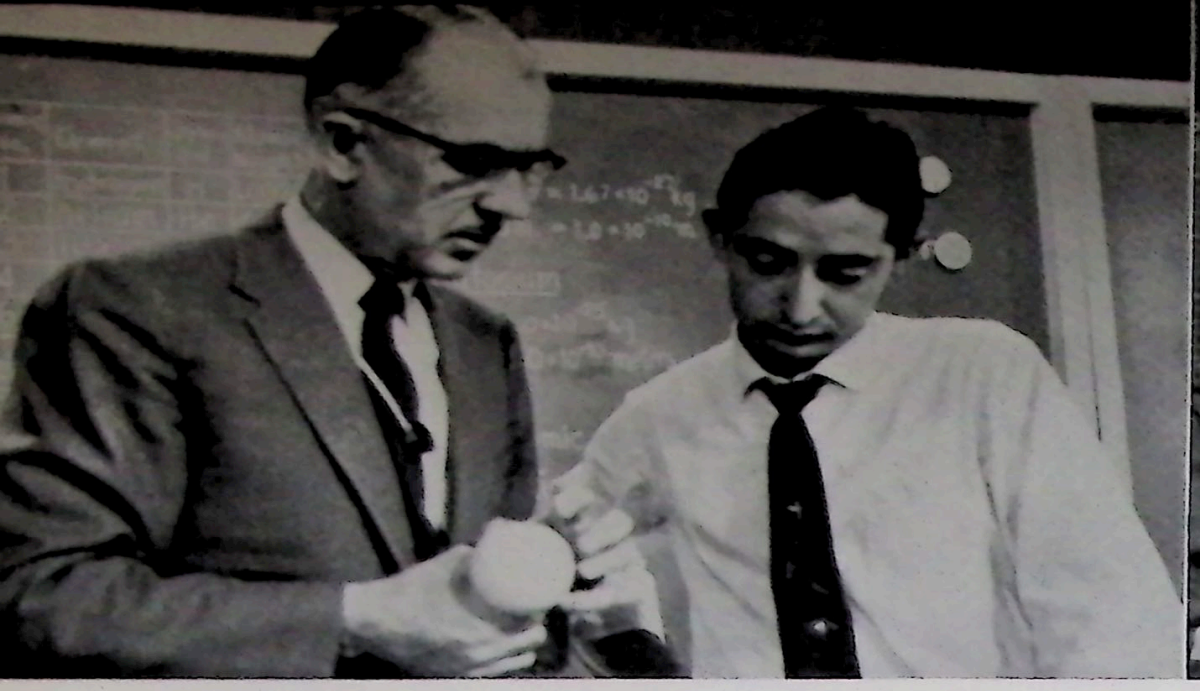


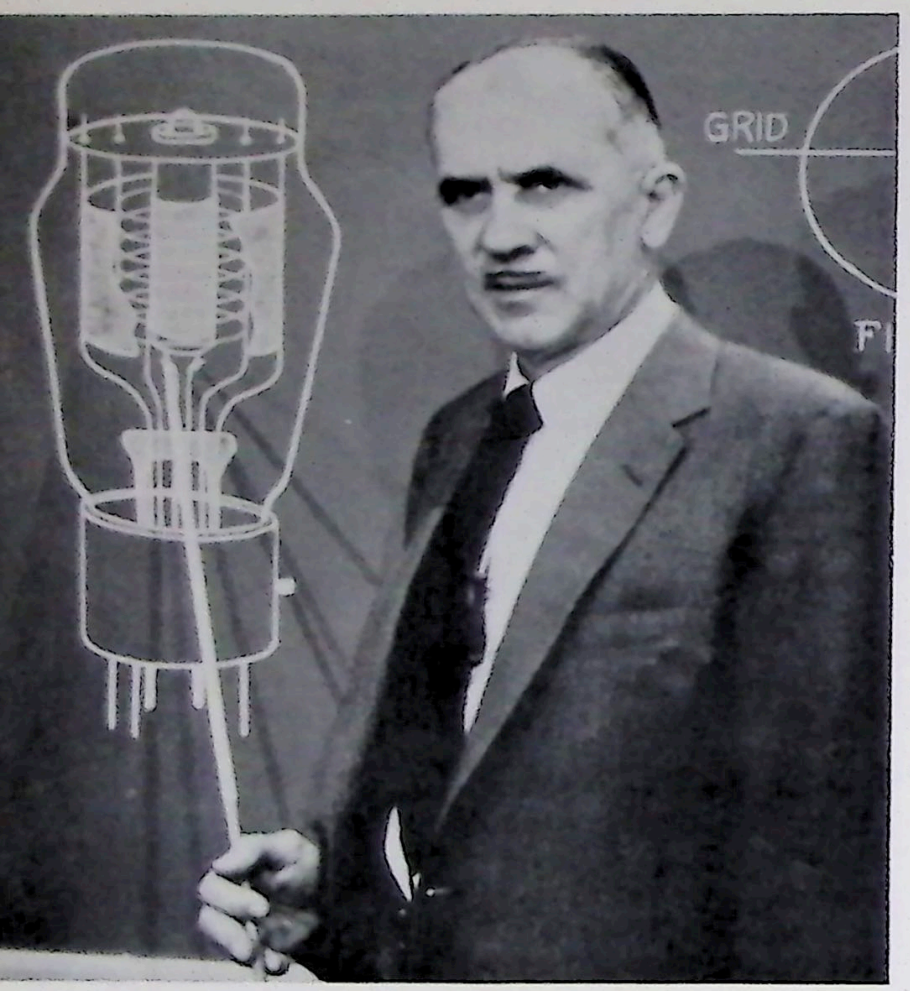
*Dr. Harvey White teaches more students introductory physics every year than all other physics teachers combined. Students enter the classroom to find a projector set up and dark curtains drawn, ready for the day's half-hour film lesson to light up the screen.*

# Complete Course in Introductory PHYSICS

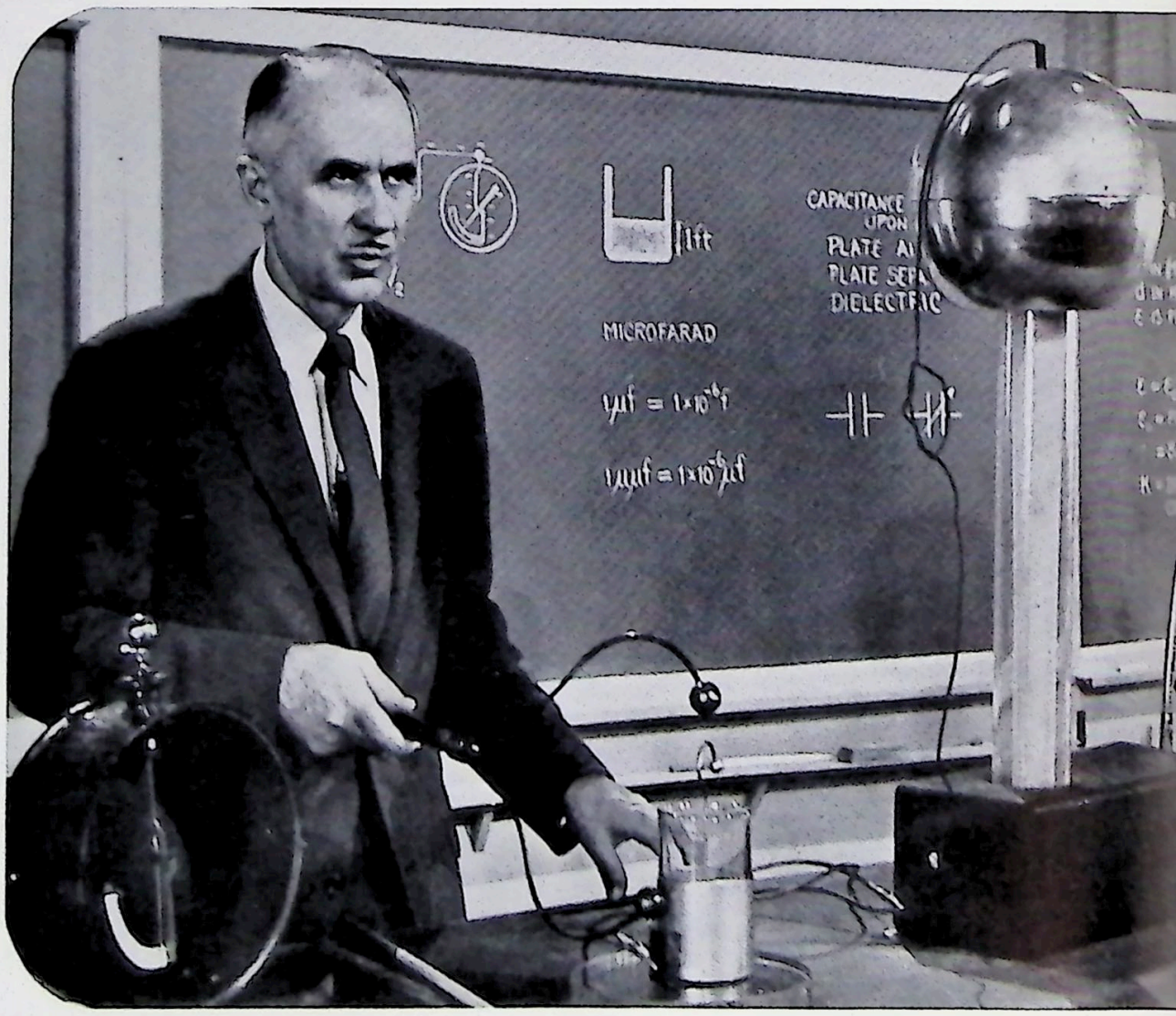
*The camera moves in on Dr. White for a close-up to give the feeling of intimacy which comes across in the classroom and is appreciated by viewers, who feel the eminent physicist is talking to them alone.*



*Dr. White discusses camera angles for one of his filmed physics lessons with an Encyclopaedia Britannica cameraman in the photograph at the left. At the right, he talks over aspects of the complicated project with David Ridgway, producer of the series.*




*A teacher of physics and other science subjects for 25 years commented, "The grades of students taught by the Encyclopaedia Britannica physics films are at least one quartile above those who have not seen the films. Many times, Dr. White presents concepts using better methods than I have developed over the years. Without the films we could never have seen such equipment or had so many excellent demonstrations."*




*In Dr. White's physics laboratory the experiments always work, so class time is never lost on experimental failures. The only equipment the classroom teacher needs to set up is the projector, thus saving valuable time and eliminating costly apparatus from the school budget. Some schools make the films available to students so that they may see reels they have missed through absence from class, or re-run in their free time lessons that they do not fully understand.*

ENTHUSIASTIC comments by teachers using the Encyclopaedia Britannica Introductory Physics Course on film reflect the general attitude of all teachers throughout the United States in school systems employing the filmed course taught by Dr. Harvey E. White, vice-chairman of the Department of Physics, University of California, and the author of the text, *Physics—An Exact Science.*

The idea for the films started in May, 1956 at hearings conducted by a Subcommittee on Research and Development, investigating shortages of manpower and scientists. Since industry pays up to three times the amount of teacher salaries, schools are hard pressed to maintain science subjects in the curriculum, but by using the films, which can be shared by several schools, the lifetime cost of the course comes to considerably less than the salary of a teacher for a year. The films also answer the problem of maintaining the high standards demanded by colleges for students going on to advanced study in the field. College deans blame poor high school preparation in science and mathematics for the high number of college flunk-outs. It is little wonder that the introductory physics films have been so well received by American educators, teachers and students!

Before being put on film, the physics course was under study for over a year. It was necessary to find a "master teacher," a physicist of genuine stature, and with extensive classroom background as well as experience in teaching before a camera. After considering all the possibilities, Dr. White, a physics teacher for more than twenty years, was selected. Known for his significant contributions in the field of physics research, he has developed over the years a storehouse of uniquely vivid demonstration devices and techniques, designed to communicate abstract concepts in fundamental physics. Together with other rare and expensive demonstration apparatus borrowed from leading institutions for the course, they provide an array of equipment never before seen in a single classroom anywhere in the world—a quarter of a million dollars in equipment belonging to the University of California, the University of Pittsburgh, Carnegie Tech, Westinghouse, General Electric and the Mellon Institute.

The Encyclopaedia Britannica Films physics course was outlined to fit in with texts used by a majority of systems and "sets" were designed to handle a wide range of demonstrations in each session, while permitting cameramen to set up and maneuver their complex equipment. Thousands of hours of time were put into preparation by Dr. White and Encyclopaedia Britannica Films cameramen, with meticulous attention to detail and exact camera angles. The result is that every student in the classroom can see the demonstrations better than if he had a front row seat.

Only about half of the American schools offer a physics course and many of these do not offer it every year. In contrast, Russia requires five years of physics, four of chemistry, one of astronomy and six of mathematics, including calculus—just in high school. Russia is graduating about 53,000 engineers and scientists with Master's degrees each year, compared to around 24,000 Americans educated only to a Bachelor's degree level.

That this lag is not entirely the fault of students has been proven by the fact that when schools offer the dynamic Encyclopaedia Britannica film series, enrollment in physics classes always goes up—often as much as thirty per cent. One teacher reported, "Several students, football players and others engaged in outside activities, wanted to see the films and started coming in while the teacher was previewing them."

In classes of medium intelligence using the film method, it was observed that all of the film-taught groups showed gains larger than those obtained by groups of equal intelligence in traditional classrooms. Teachers also report that never before have they had such an awareness of the individualities of their students. While concentrating on the explication of relatively difficult subject matter, working at a blackboard much of the time with his back to the class, the teacher had little opportunity to observe students as individuals. With the content communicated by the teacher on film, the classroom teacher can observe reception—which makes possible a teacher-pupil relationship on a much higher level of awareness and understanding.

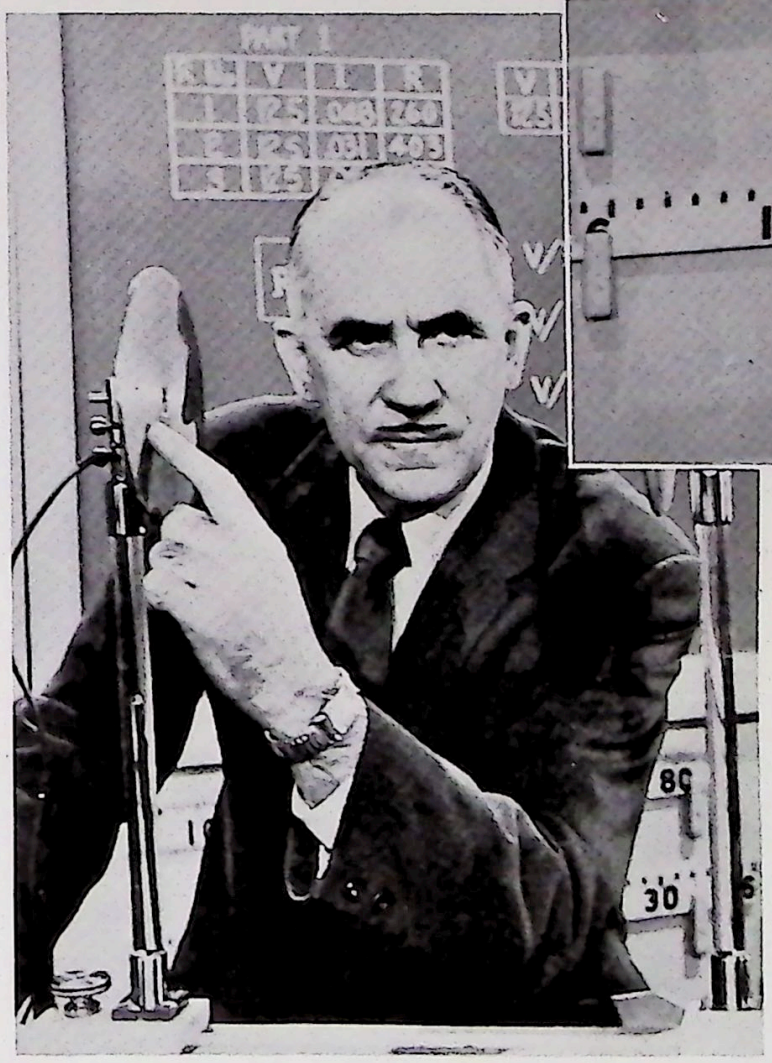
In addition to their use in teaching students, the films also provide superior teacher training with this unprecedented opportunity to watch a top instructor, supported by lavish demonstration facilities. Another important use is in giving adults in industry the basic instruction in physics they missed during school years, without interfering with their work.

Besides the complete introductory course, Encyclopaedia Britannica Films offers a distinguished list of separate films dealing with fundamental concepts in the major areas of physics. These films are designed as basic instructional materials for use in any physics course and include such subjects as *Jet Propulsion, Problems of Flight, Electrodynamics, Magnetism, What Is Electricity?, Energy and Its Transformations, Thermodynamics, Fundamentals of Acoustics, Archimedes' Principle, Laws of Motion, The Atom and Industry, Atomic Energy* and dozens of other physics films created for junior and senior high school students.

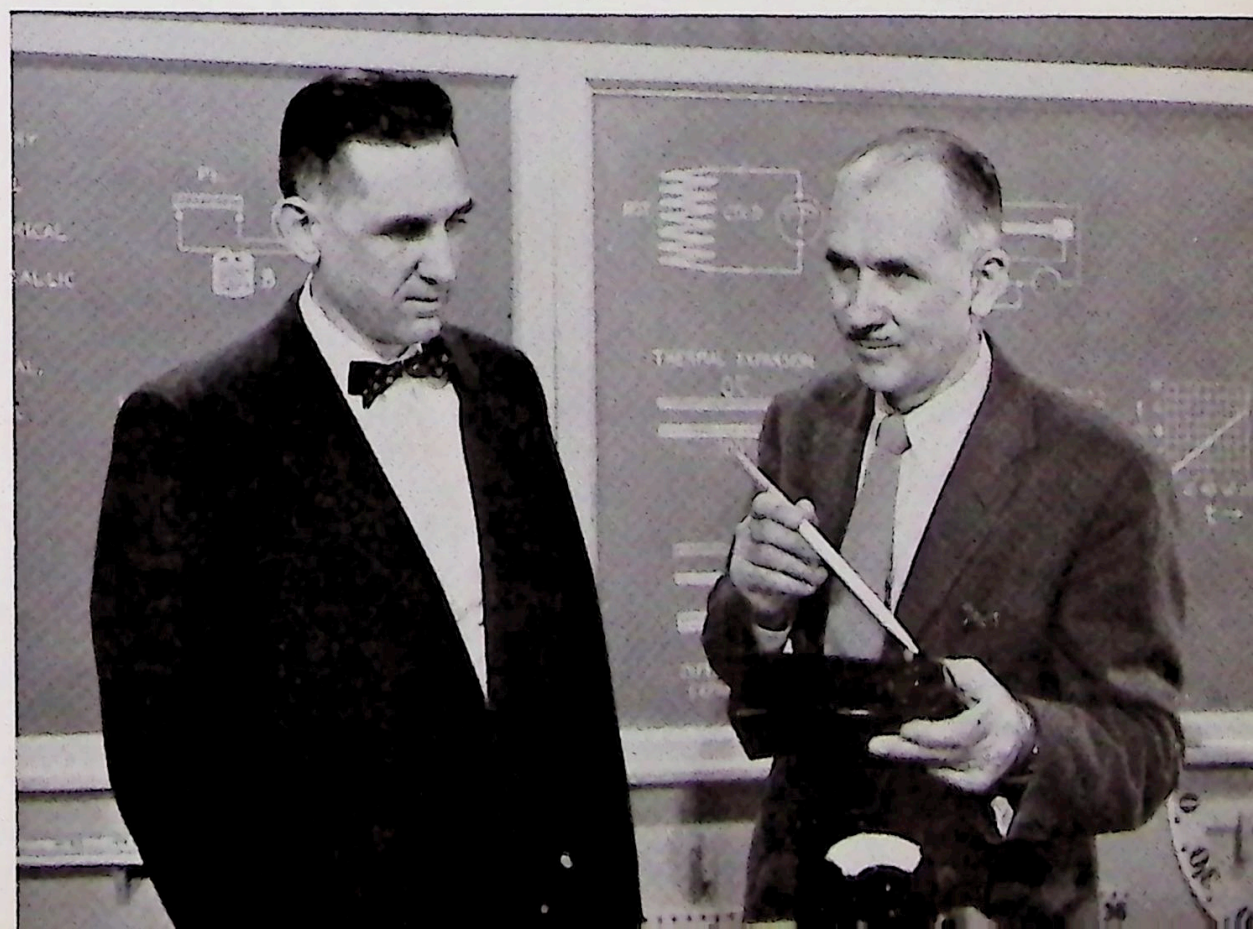
In the modern educational system, Encyclopaedia Britannica films are not just aids to teachers; they are a vital necessity in giving the student of today the first-class education he needs and deserves. ♦

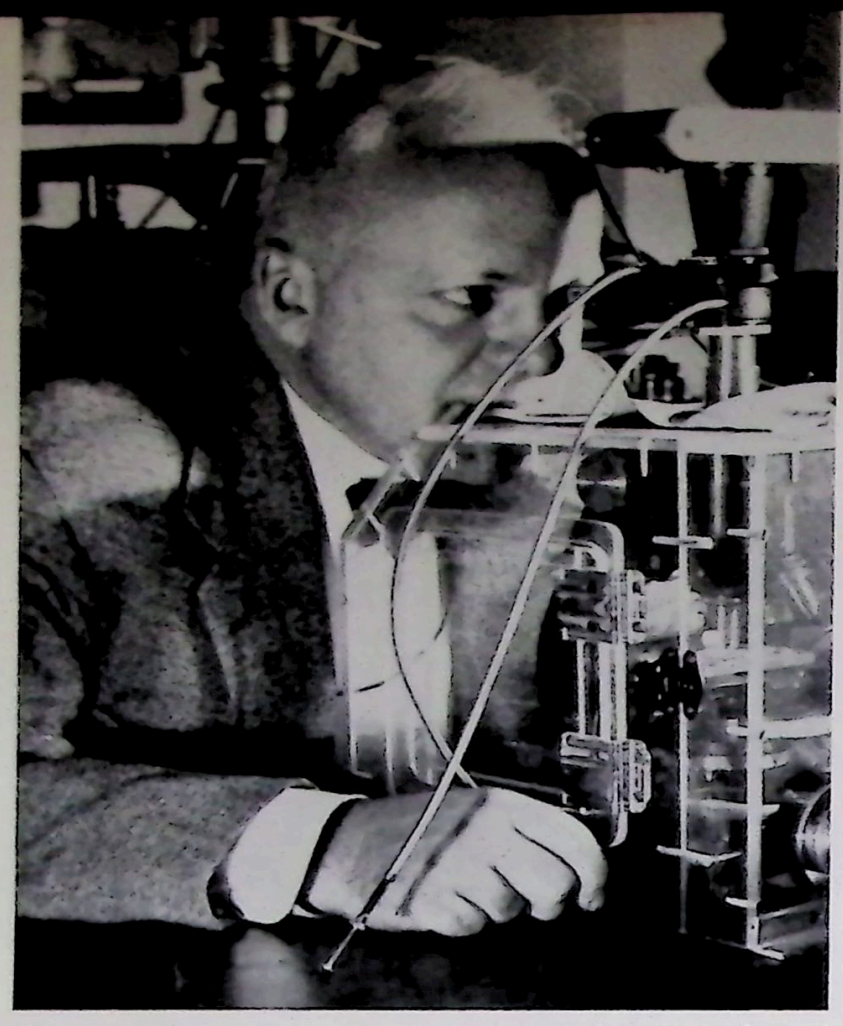
*Dr. White's physics course is divided under 11 subject headings with a varying number of periods for each, ranging from 44 for mechanics to 3 for special lessons. Also covered are properties of matter, heat, sound, light, electricity and magnetism, atomic physics, electronics, quantum optics and nuclear physics.*

*After completing the gigantic and unusual teaching task, Dr. White commented that making the film was "a terrific amount of work under great tension, but there's a lot of satisfaction in the knowledge that these lectures will be seen over and over again by thousands of students. It's a rare opportunity for a teacher—to be able to help so many young people."*

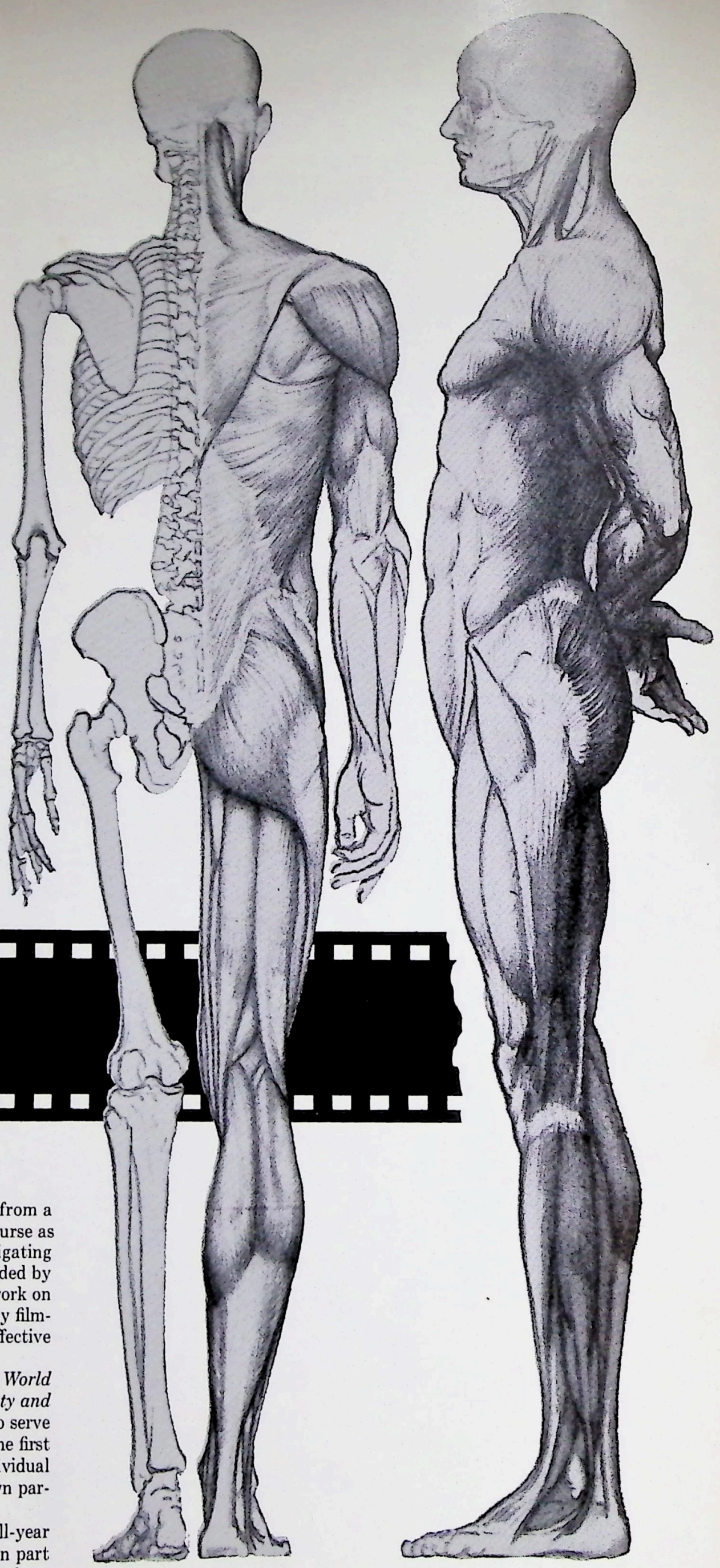


*Warren P. Everote, Encyclopaedia Britannica Films Vice-President in Charge of Production, took a vital interest in the filming of the introductory physics series—the first complete course ever put on film.*





*The eminent biologist, Dr. Ralph Buchsbaum, author of "Animals Without Backbones," and member of the University of Pittsburgh faculty, is coordinating the Encyclopaedia Britannica Films' new biology series. Under his guidance, biologists who are outstanding specialists in their fields are creating an exceptional program that assures the greatest authenticity and scientific insight.*

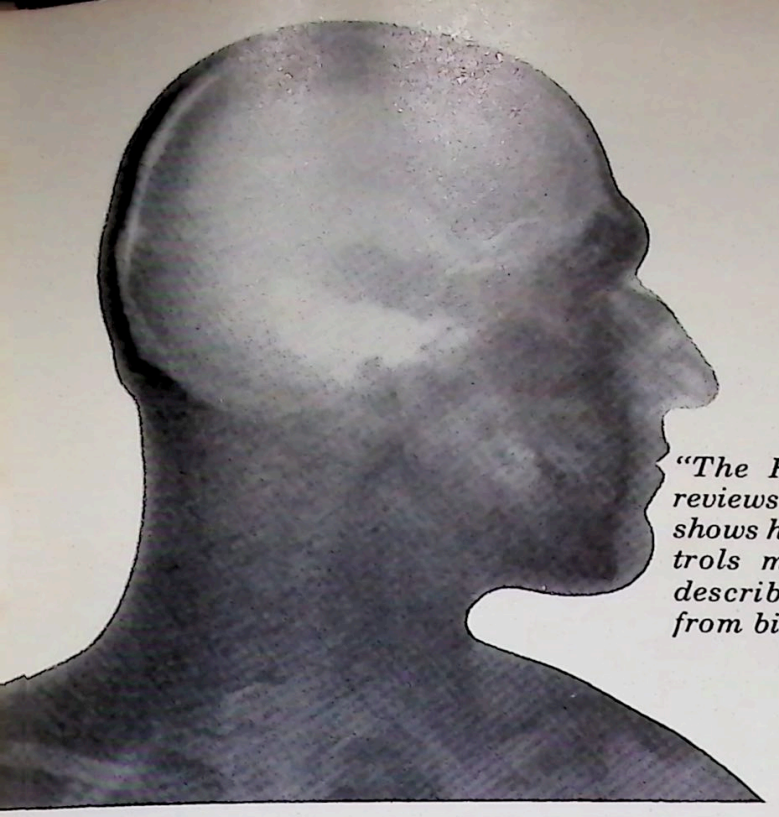


# HUMAN BIOLOGY

MANY students will receive their entire knowledge of biology from a single high school course, while others will use the same course as the first step toward a professional career in science. After investigating the needs of both groups as well as the kinds of visual material needed by biology teachers, Encyclopaedia Britannica Films has commenced work on a revolutionary new biology series of sixty-six films, supplemented by filmstrips wherever the still picture technique is the best medium for effective communication.

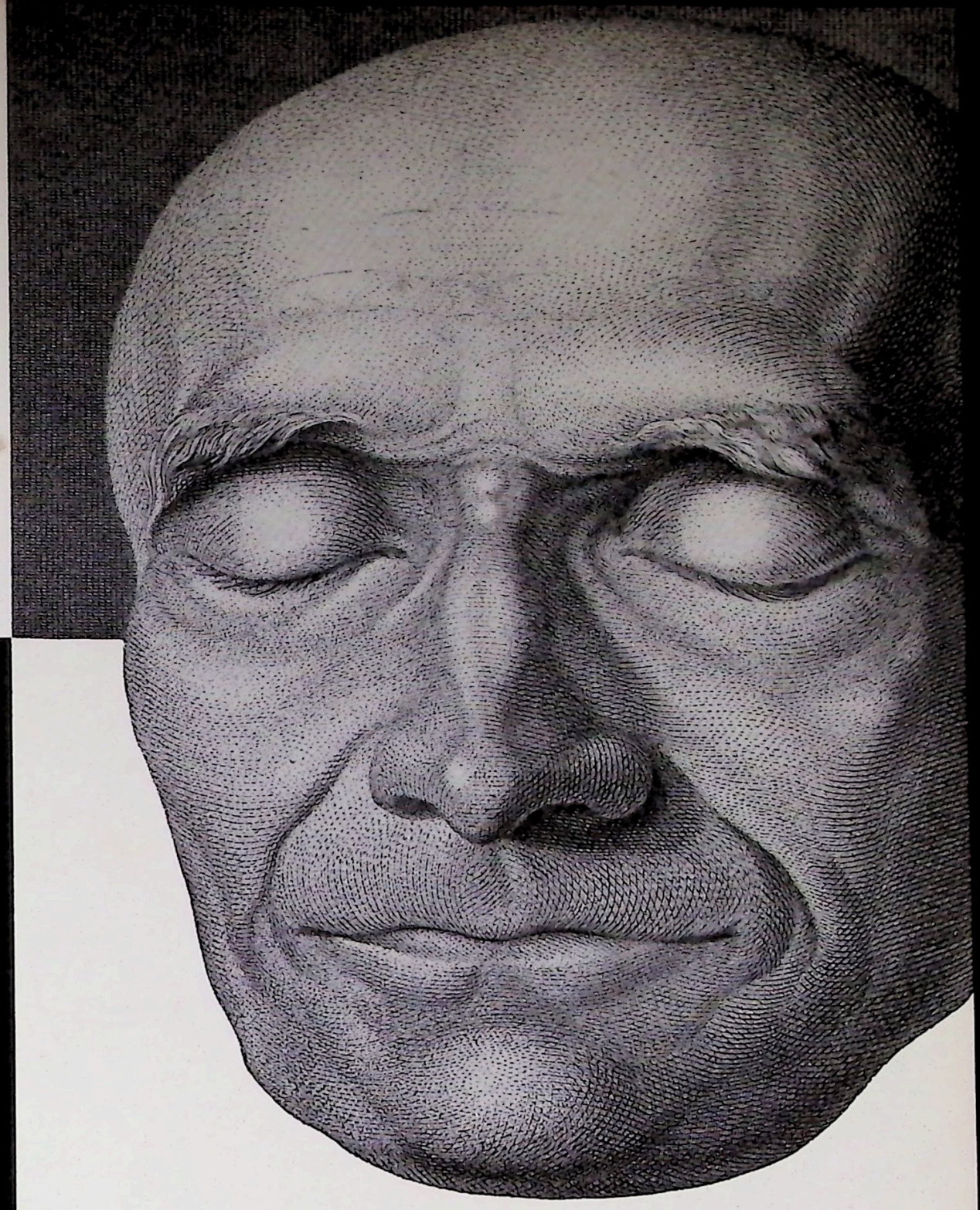
The series is divided into five fundamental units: *Ecology: The World of Life About Us, Plant Life, Animal Life, Physiology* and *Heredity and Adaptive Change.* The course manual will be flexible to enable it to serve as a biology reference book at any level, from tenth grade through the first year of college. While the program is fully integrated, the individual teacher may arrange his subjects in the order best suited to his own particular requirements.

The decision of Encyclopaedia Britannica Films not to film a full-year course for biology as they did for physics and chemistry is based in part on a recent careful study of biology teaching which disclosed that there



*Stimuli from the sense organs are received by the cerebrum, transmitted to the areas concerned with their recognition, and sent to the frontal lobes for association with past experiences and selection of an appropriate response.*

*"The Human Brain" film reviews the brain's structure, shows how the cerebrum controls man's behavior and describes how it develops from birth to maturity.*



are presently enough competent biology teachers, and their number is increasing adequately to meet the need. Also, there is less uniformity in the content of biology courses and greater differences in the needs of teachers in different school systems.

This program of films and filmstrips reinforces and enlarges the teacher's contribution. It does not replace it. Each subject brings a measure of reality into the classroom by dealing with phenomena which it is impossible to present without the use of camera techniques. A number of the films cover such vital areas as ecology and genetics—subjects that as yet have not received sufficient attention at the high school level.

A primary objective of the materials in this program is to enable the student to think critically and imaginatively about living things. To this end, a distinguished committee of collaborators, headed by Dr. Ralph Buchsbaum of the University of Pittsburgh, has, with painstaking care, selected the basic concepts, the laboratory and field experiences and the vocabulary to be included. Among the films already available are *Succession: From Sand Dune to Forest, The Chick Embryo: From Primitive Streak to Hatching, Social Insects: The Honey Bee, Seed Generation, Fungi* and *DNA—Molecule of Heredity.*

Almost two dozen other Encyclopaedia Britannica films at the junior and senior high school level help students understand the significance of biology as a means of understanding themselves and becoming better acquainted with their biological environment, beginning with *Introduction to Biology. Heredity,* for instance, explains schematically the transmission of hereditary factors responsible for inherited characteristics in animals. It illustrates simple applications of the laws formulated by Gregor Mendel: the law of dominance, the law of independent unit characters and the law of segregation. The determining factor of genes in the heredity of shorthorn cattle and guinea pigs, in regard to color and other attributes, is dramatically illustrated.

Anton van Leeuwenhoek, inventor of one of the earliest microscopes, was perhaps the first man ever to observe bacteria. His contributions to bacterial study, as well as those of Louis Pasteur, are shown in *Bacteria—Friend and Foe.* This film reveals that among the many kinds of bacteria, some are harmful to man, others are beneficial and still others are harmless —but without any bacteria, life as we know it would not be possible.

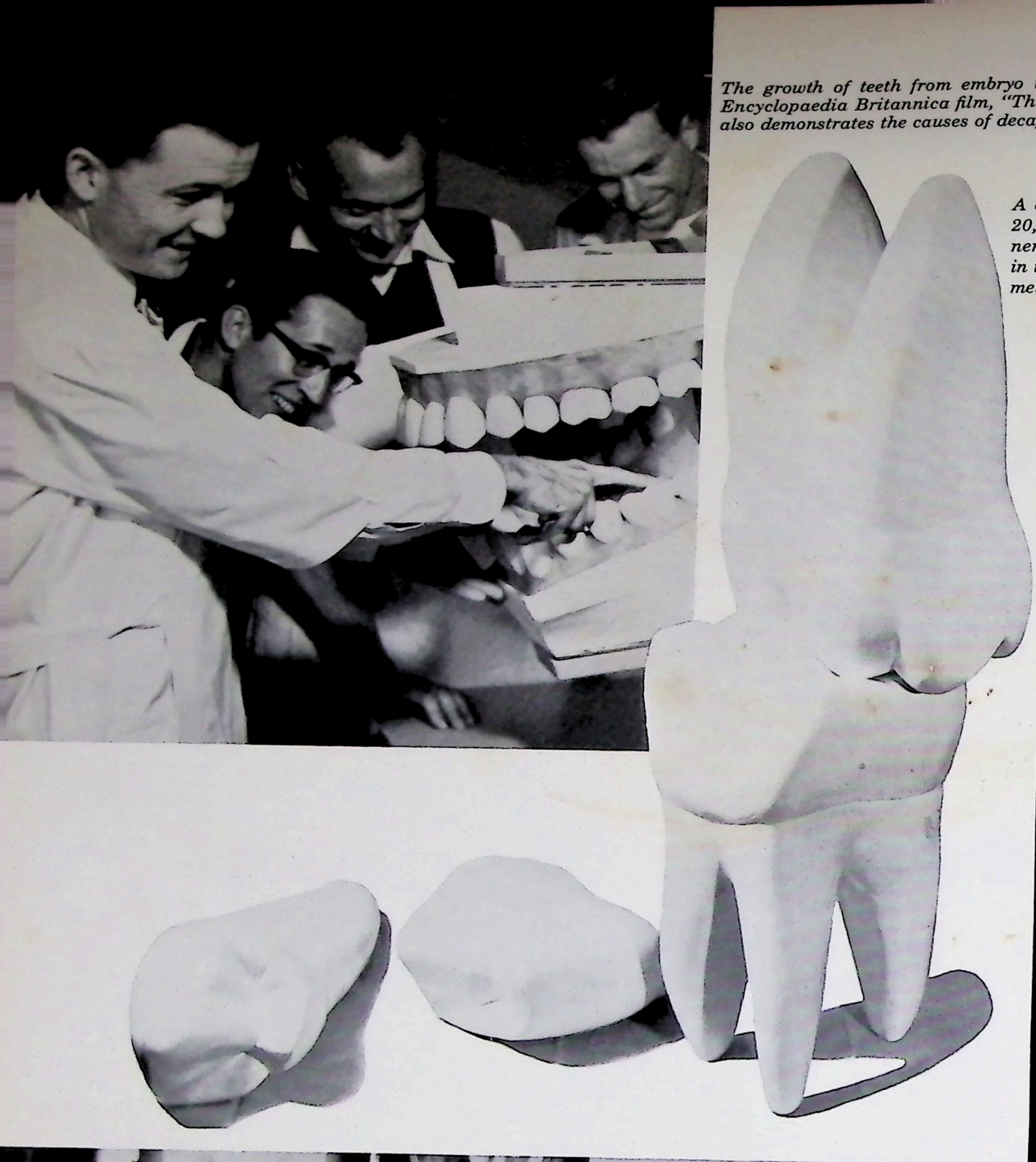
A classroom film entitled *The Skeleton* furnishes a detailed description of the formation, growth, development and functions of the human framework. Dramatic motion picture X-ray photography shows how joints move and attention is called to the role of proper food and posture in correct bone development. *Biography of the Unborn* traces the creation of life from the instant of fertilization to the moment the infant begins independent life, recording the development of the embryo and the fetus in the mother's womb.

*The Nervous System* examines the structure and function of the spinal cord, medulla, mid-brain, thalamus and cerebrum, explaining through animated drawings how sense organs receive their stimuli, and how nerves carry impulses to the central nervous system and thence to muscles. The color film, *Work of the Blood,* demonstrates the structure of blood cells, the composition of plasma and the way the circulatory system circulates food elements, removes waste, equalizes heat distribution and defends against disease.

Other films illustrate bodily functions: *Alimentary Tract, Control of Body Temperature, Digestion of Foods, The Ears and Hearing, Endocrine Glands, The Eyes and Their Care, Mechanisms of Breathing, The Work of the Kidneys* and numerous other aspects of man's fascinating organic processes and phenomena.

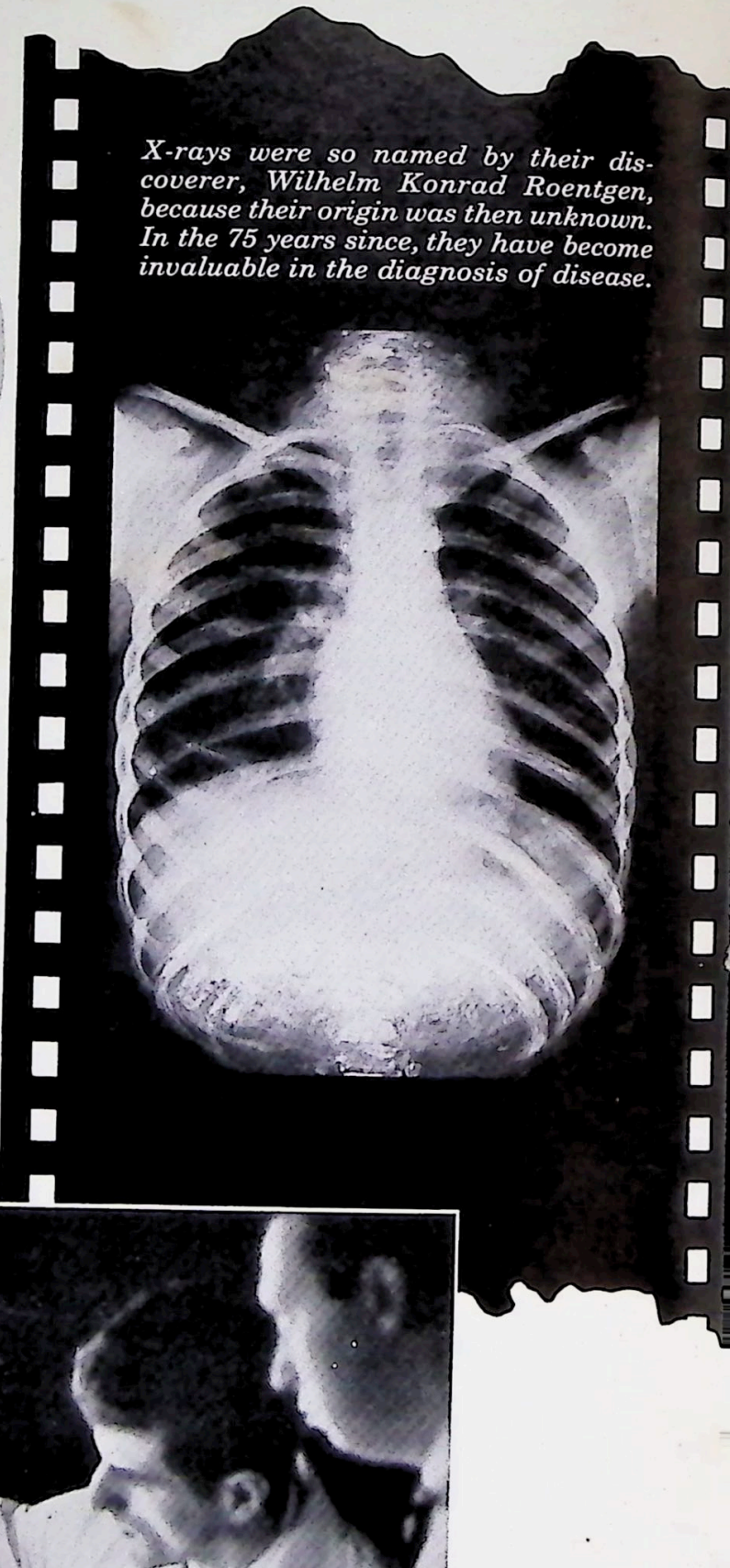
It is utterly impossible for even the very best teacher with the very best texbooks to impart to the student even a basic understanding of human biology with the thoroughness, clarity, interest and small investment of valuable teaching time that Encyclopaedia Britannica makes possible with informative, detailed human biology motion pictures. Techniques of animation, X-ray photography, microphotography and time-lapse photography, plus specialized equipment, permit the photographer to take man apart, cell by cell, organ by organ and function by function, to reveal the amazing complexity, ingenuity and detail of his physical being. ♦

*The growth of teeth from embryo through adulthood is the subject of the Encyclopaedia Britannica film, "The Teeth—Development and Care," which also demonstrates the causes of decay and how it can be prevented.*

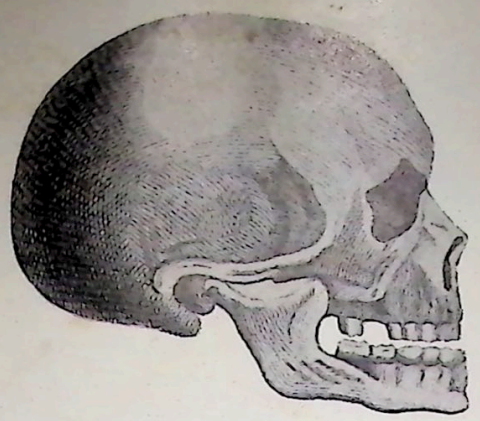


*A child's first teeth number only 20, while an adult has 32 permanent teeth, 16 in the upper and 16 in the lower jaw, arranged in symmetrical sets of 8 on each side.*



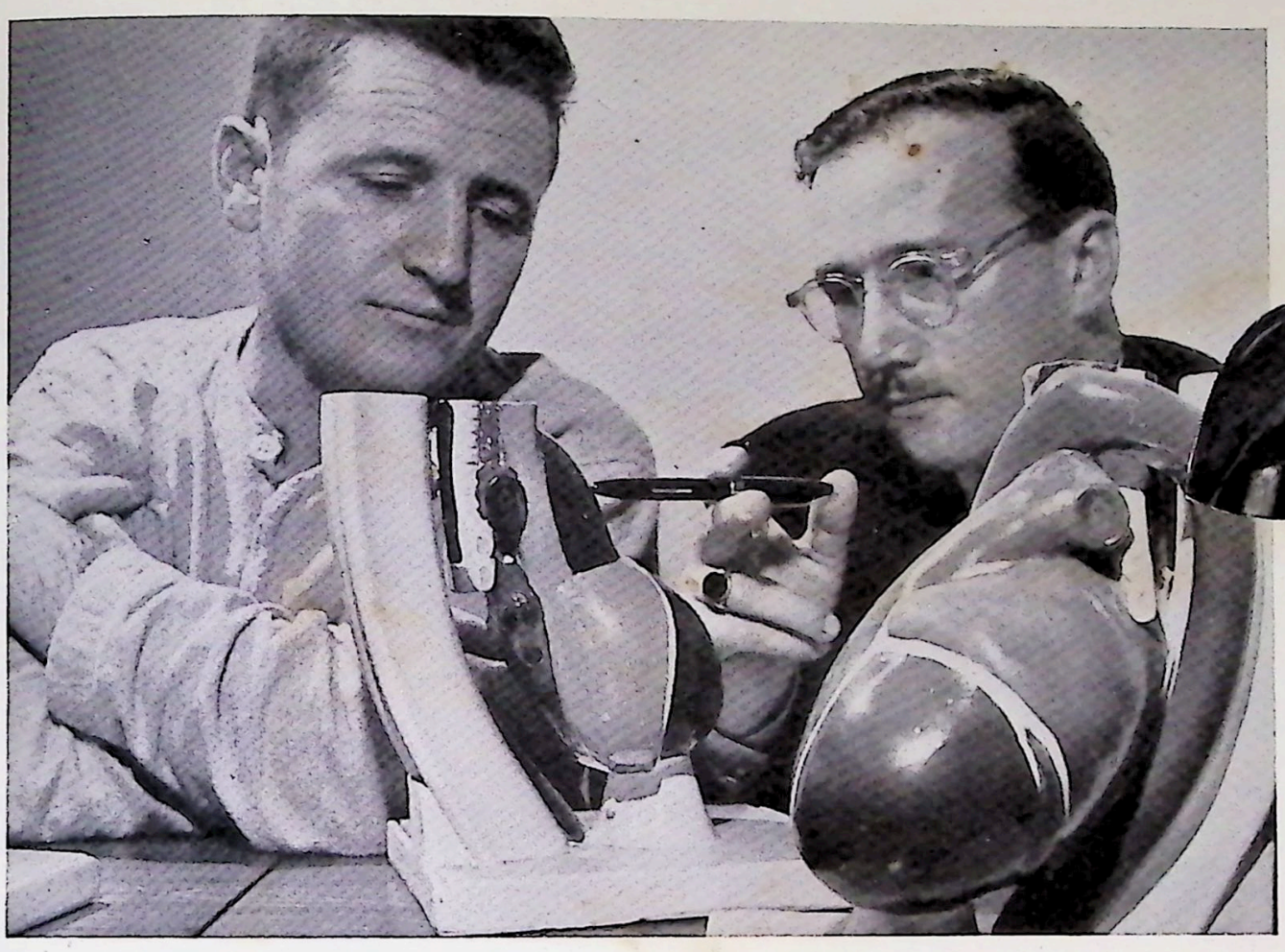


*X-rays were so named by their discoverer, Wilhelm Konrad Roentgen, because their origin was then unknown. In the 75 years since, they have become invaluable in the diagnosis of disease.*

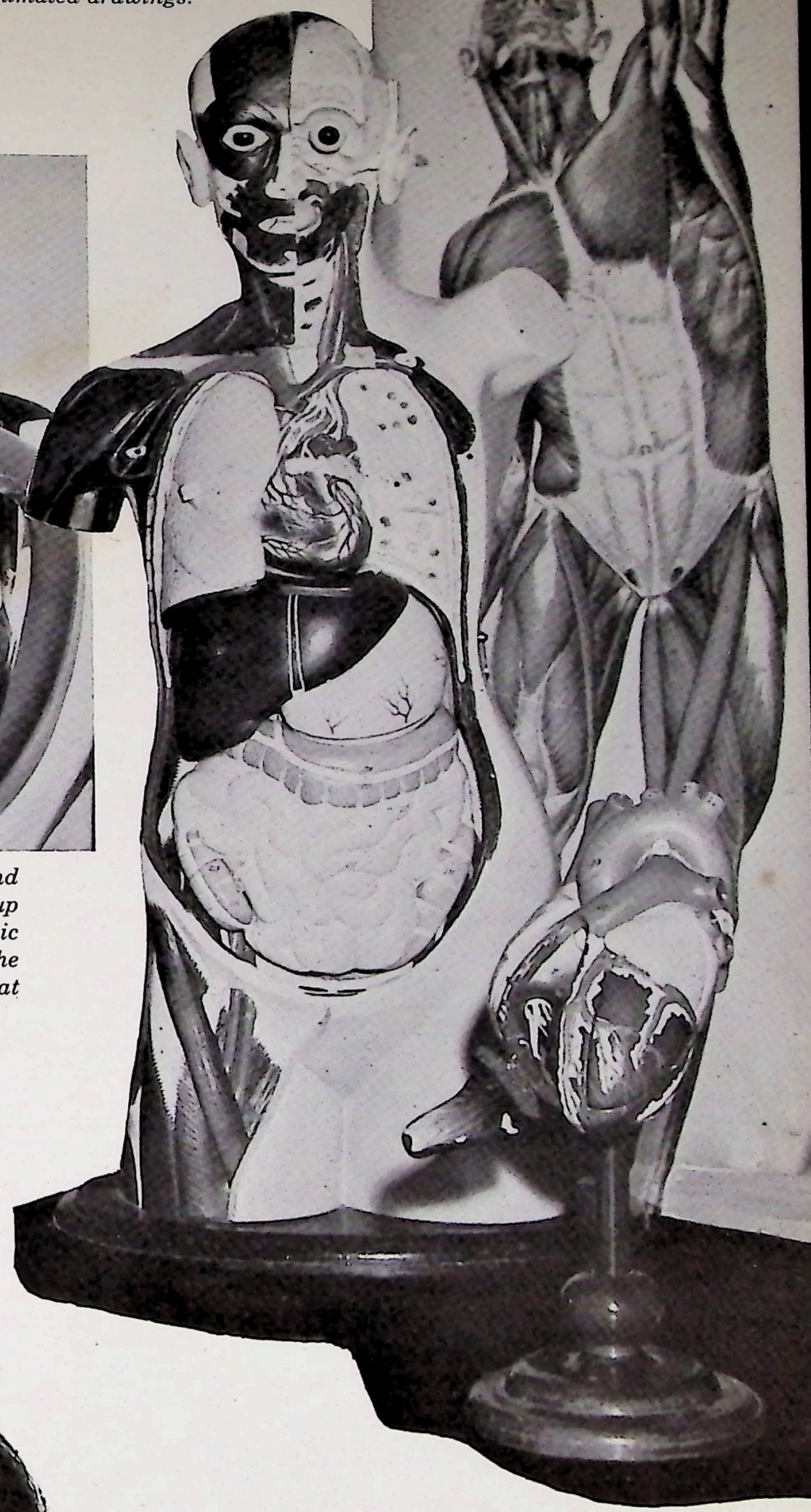


*Encyclopaedia Britannica motion pictures on biological subjects have replaced expensive anatomical models in many classrooms through putting the same material on film, with the added advantage the camera has of being able to put the human organs to work by means of animated drawings.*

*The skull is the skeleton of the head, protecting the delicate brain, the nose, eyes and ears. The brain has an additional protection in a tough fibrous envelope within the skull.*



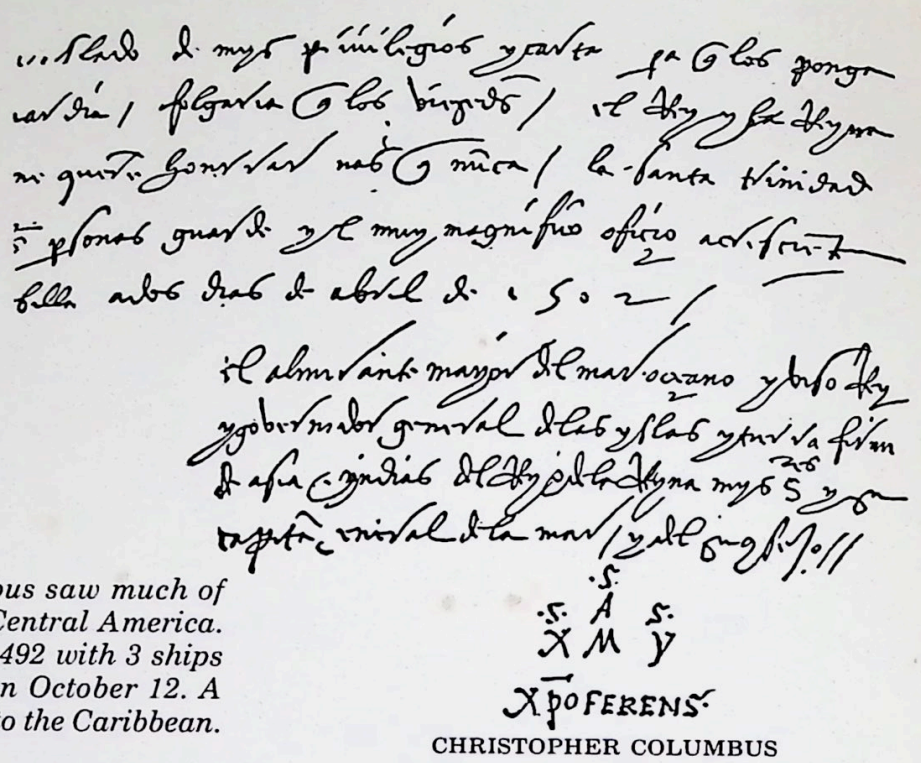
*Biology teachers everywhere have eagerly acclaimed the film, "Heart and Circulation," as an invaluable educational tool. By means of unusual close-up shots, cinemicrography and animated drawings, the film provides a graphic explanation of muscular and valvular heart action, the circulatory system, the circulation of blood throughout the body, the factors affecting rate of heartbeat and flow of blood and reproduces the actual sound of a human heartbeat.*



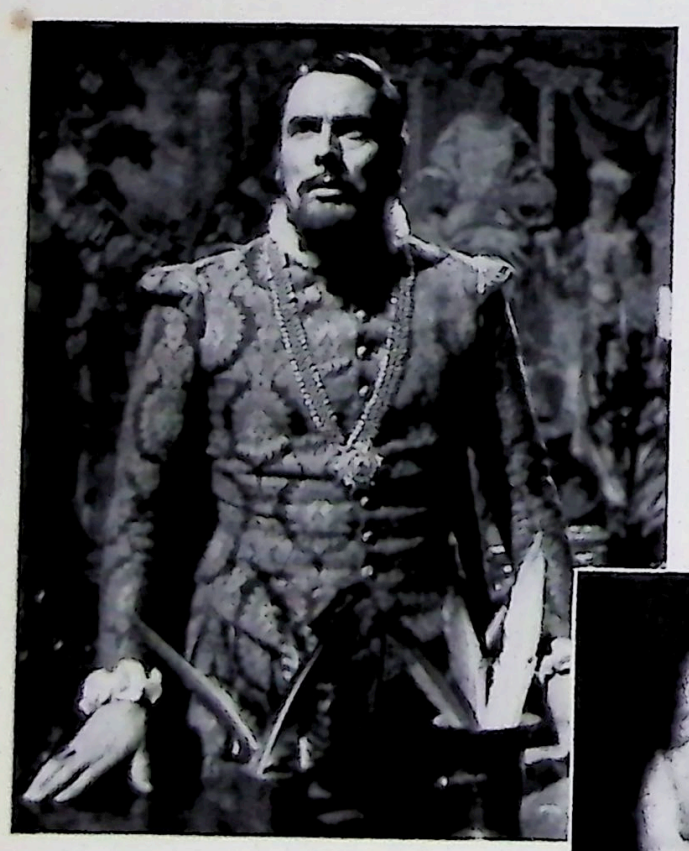
*Animated drawings and other photographic techniques used in the film, "Eyes and Their Care," reveal the various parts of the eye, explain the physiology of sight and indicate the way man learns to see only as he practices using his eyes. Major sequences illustrate such eye defects as near-sightedness, far-sightedness and astigmatism, describe their correction with glasses and stress the importance of guarding the eyes by proper lighting and food and by preventing disease and injury.*

# American

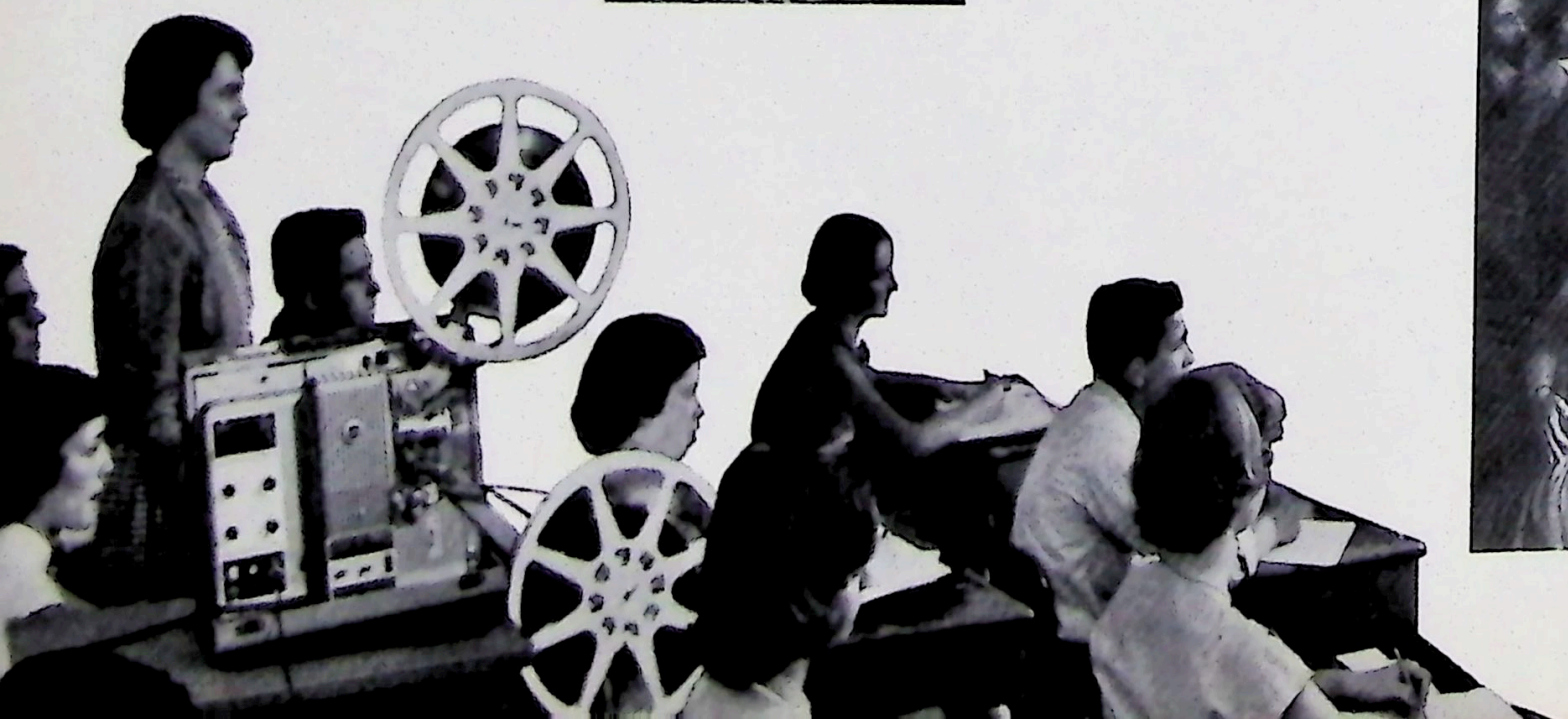
*In 4 voyages to the New World, Columbus saw much of the West Indies and parts of South and Central America. On his initial voyage, sailing August 3, 1492 with 3 ships and 88 men, he reached San Salvador on October 12. A year later, he took 17 ships and 1,500 men to the Caribbean.*



CHRISTOPHER COLUMBUS



*The Encyclopaedia Britannica film, "Sir Francis Drake," dramatizes the adventures of the man who won England the right of way into "the newe world called America." The role of Drake, the boldest of the English pirates, in England's rise as a sea power and as a wily plunderer of Spanish ships and settlements, has an immediacy and excitement on the screen never found in history books.*



# HISTORY

HISTORY is made up of exciting events that involved real people—not just names, dates and facts entombed in dull words on a printed page. The bored generations who remember only that "Columbus sailed the ocean blue in fourteen hundred and ninety-two" are giving way to a new generation, aware of the humanity and color of the events that went to make up their American heritage.

The difference has been brought about through Encyclopaedia Britannica films on historical subjects, approximately forty in all, revealing the human drama, principles and heroic effort that were invested in the founding and building of this country. Students' imaginations are captured by the "who," "why," and "how" of the growth and progress of the United States and films stimulate them to learn more of this fascinating subject.

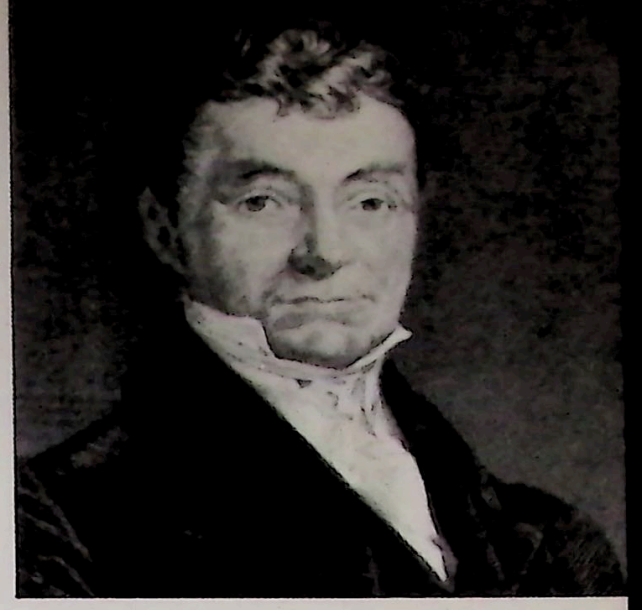
Educational motion pictures like *Story of Christopher Columbus, Early Settlers of New England, Colonial Children, Captain John Smith, The Pilgrims* and *Tom Savage—Boy of Early Virginia* reveal the courage, fortitude and quiet heroism of those who found and founded the new land. The sturdy pioneers who struck out into the vast unknown west, expanding and settling new territory, come alive in *Flatboatmen of the Frontier, Kentucky Pioneers, The Oregon Trail, Pioneers of the Plains, Daniel Boone, Discovery and Exploration, La Salle, Lewis and Clark* and *Westward Movement.*

*The Midnight Ride of Paul Revere, Jamestown* and *The Battle of Yorktown* present the preservers of the new democratic way of life. Peaceful evolution and change are seen in *It Takes Everybody to Build This Land, Immigration* and *Industrial Revolution,* and the character of the men who founded it is depicted in *Benjamin Franklin, George Washington* and *Andrew Jackson.*

These films present the pageant of United States history in a way students appreciate and remember, giving life to the colorless dates and facts formerly learned by rote from textbooks. A class reading a history assignment has as many mental images of the events they read about as there are students in the class. But when the class views a film together, each student sees the action, the people involved and the location—and wherever possible it is the authentic location—in the same way. Then, when the students study from their textbooks, they have the same frame of reference to which to relate the written account. When the student sees how the people were dressed, how they acted and the background against which events took place, his mind is free from the clutter of such detail, free to absorb the significance of what took place.

The study of history enriches enjoyment of historical literature, aids understanding of events taking place in the present time and adds interest to the area in which one lives and the places through which one may travel. It is a subject that lends itself especially well to a visual approach because history is drama, intense drama, enacted by strong characters on an often world-wide, action-packed stage.

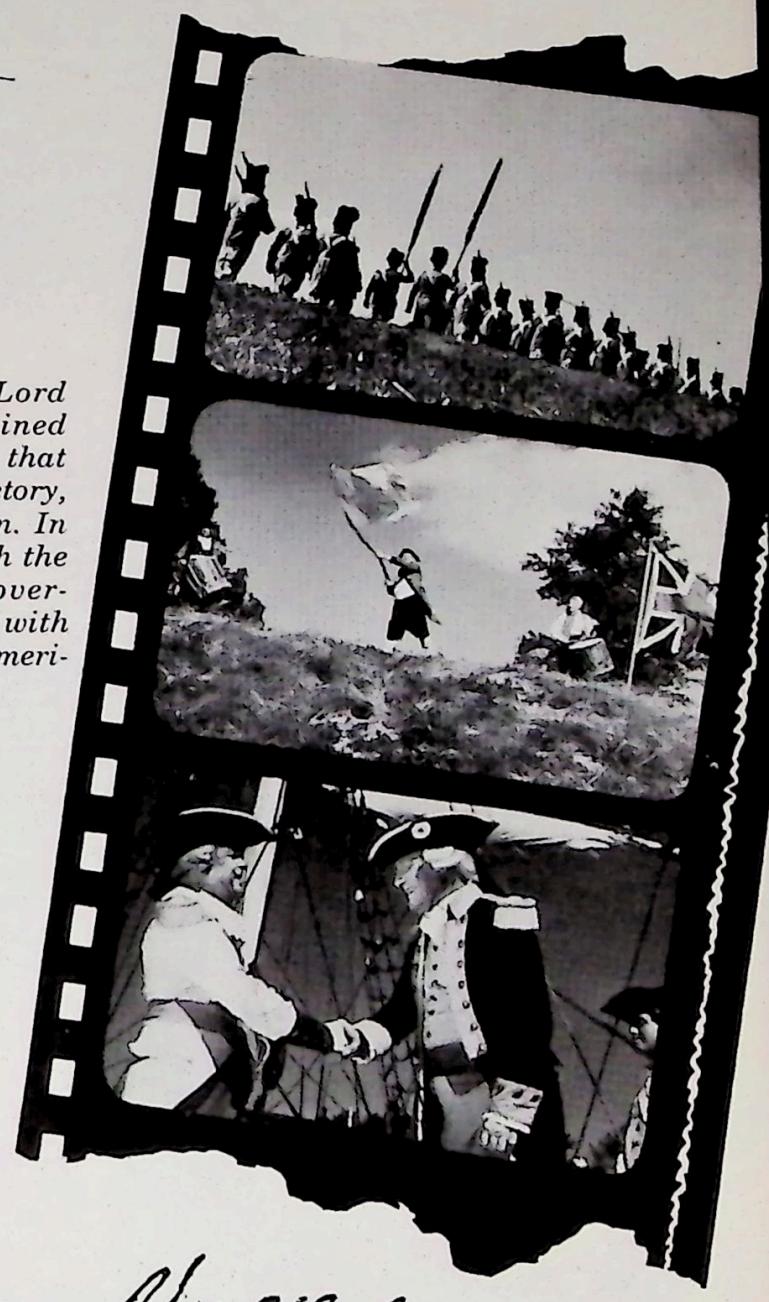
History is a constantly growing subject that greets each new class with another year's accumulation of events to be added to its already great bulk of material to be studied. The only way to keep up with this ever-increasing volume is through more effective teaching, through the best method yet devised—Encyclopaedia Britannica educational films. ♦



*"Lafayette—Soldier of Liberty," is based on highlights of the life and career of the distinguished French general, statesman and friend of American freedom, emphasizing particularly Lafayette's service to the United States, his friendship with George Washington and the part he played as a leader of the French Revolution.*

Respect I have the
Your Most obedient humble
Servant Lafayette

GENERAL LAFAYETTE

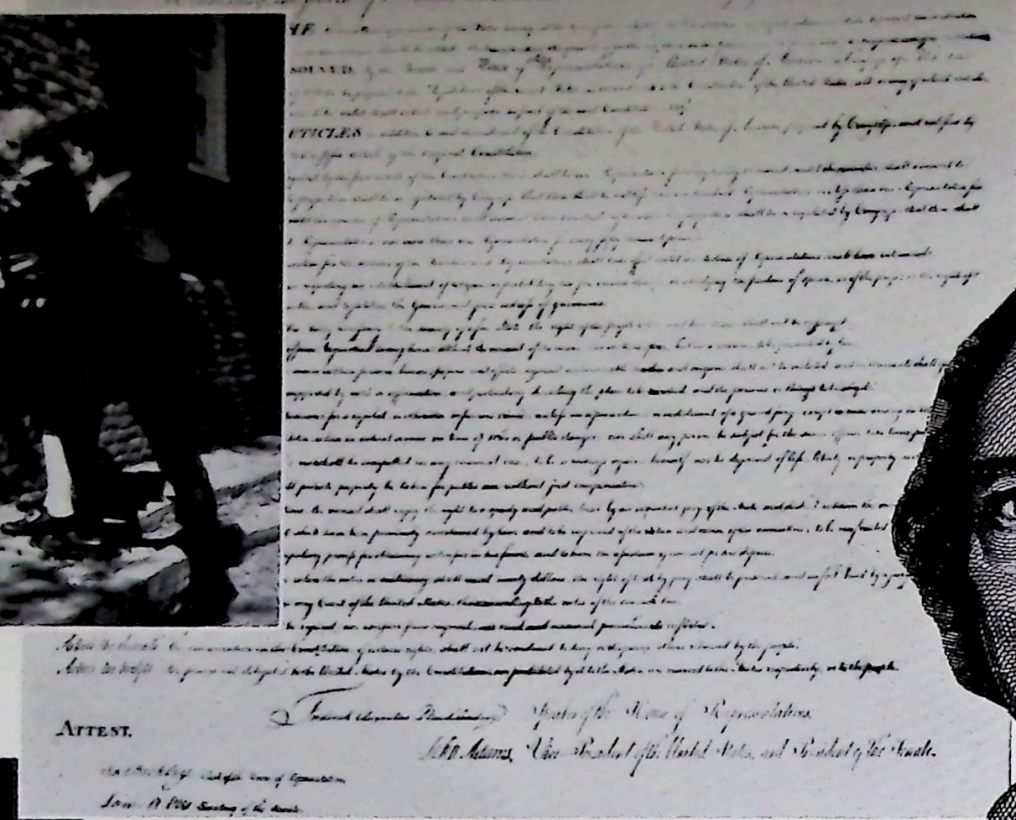


*In the spring of 1781, Lord Cornwallis, having obtained reinforcements and feeling that Virginia held the key to victory, began to fortify Yorktown. In October, Washington, with the aid of French forces, overwhelmed the British and with their surrender, assured American Independence.*

Done at York in Virginia
this 19th Day October 1781
Cornwallis
Tho.s Symonds.

LORD CORNWALLIS

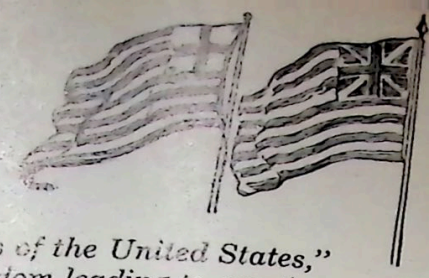
*The Mayflower Compact was signed at sea on November 11, 1620, just prior to landing at Plymouth, to begin the unending struggle for survival in the harsh New World.*


Congress of the United States.

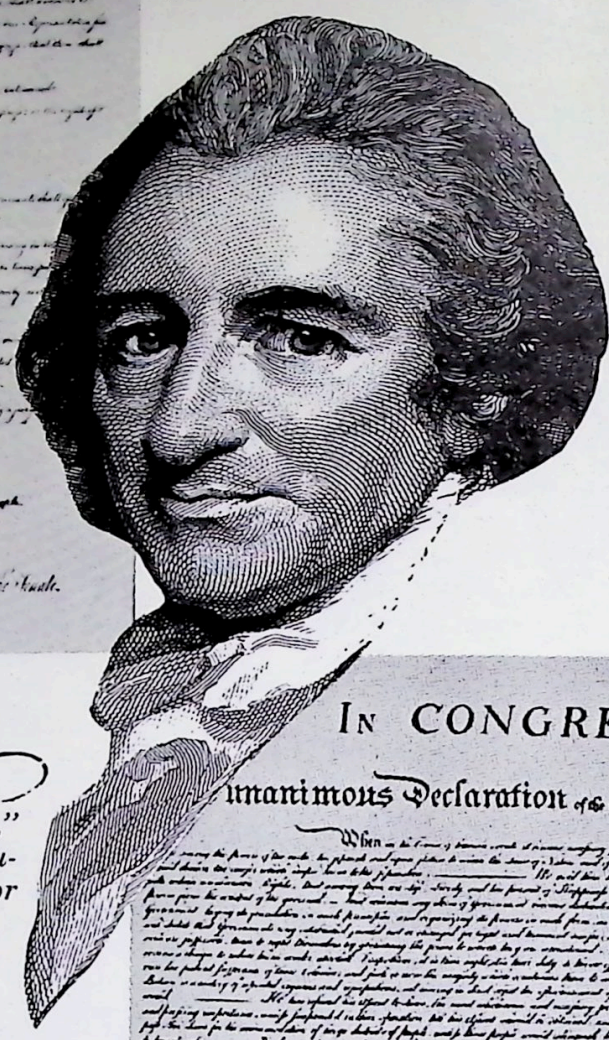
begun and held at the City of New York, on

ARTICLES

ATTEST.



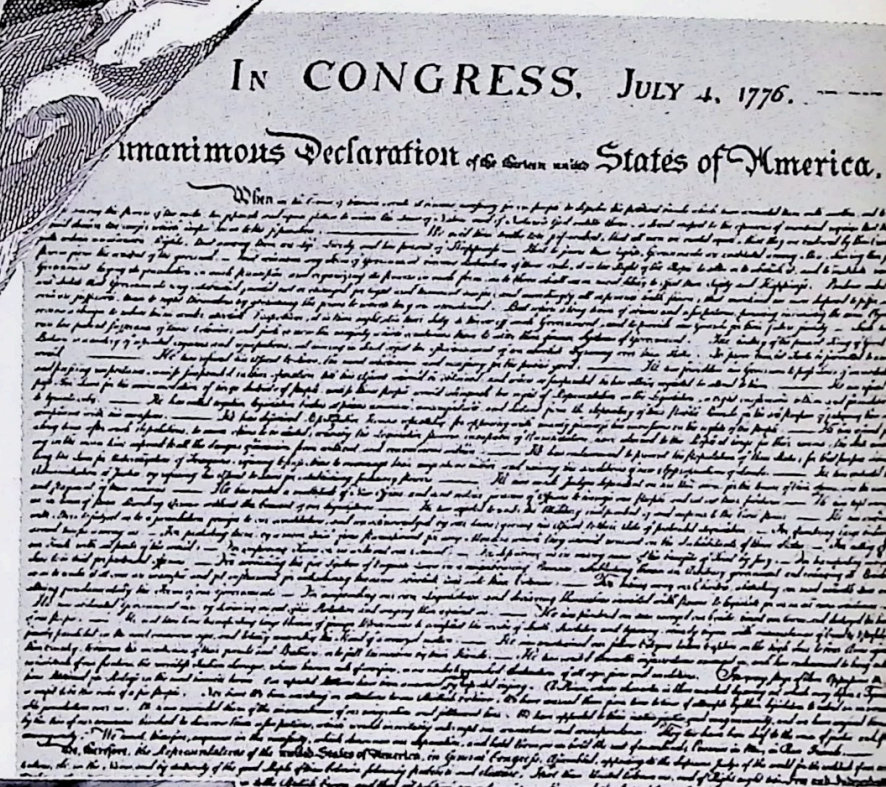
*The film, "The Bill of Rights of the United States," portrays the struggle for freedom leading to creation of the first 10 amendments to the Constitution.*



Thomas Paine

THOMAS PAINE

*"These are the times that try men's souls," wrote Thomas Paine, one of the most influential leaders of colonial opinion just prior to and during the American Revolution.*


In CONGRESS. July 4, 1776.

unanimous Declaration of the thirteen united States of America.

*Long outspoken in his opposition to British control and regarding war as inevitable, in 1775 Patrick Henry proposed arming the state militia at the second revolutionary convention of Virginia, with the words, "I know not what course others may take, but as for me, give me liberty or give me death!"*

P. Henry

PATRICK HENRY

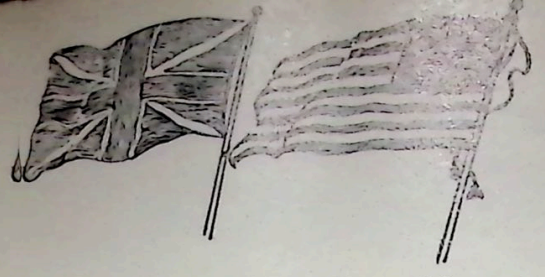
*"When in the Course of human events it becomes necessary for one people to dissolve the political bands"—the film, "The Declaration of Independence by the Colonies," relates the drama behind this declaration.*

...ation. Trans-
...long from
...d. it will
...not Peer
...be willing
...I possession
...an extent of country under a free and
...ever yet seen. being in the hurry of de-
...here offer you my friendly salutations
...been.

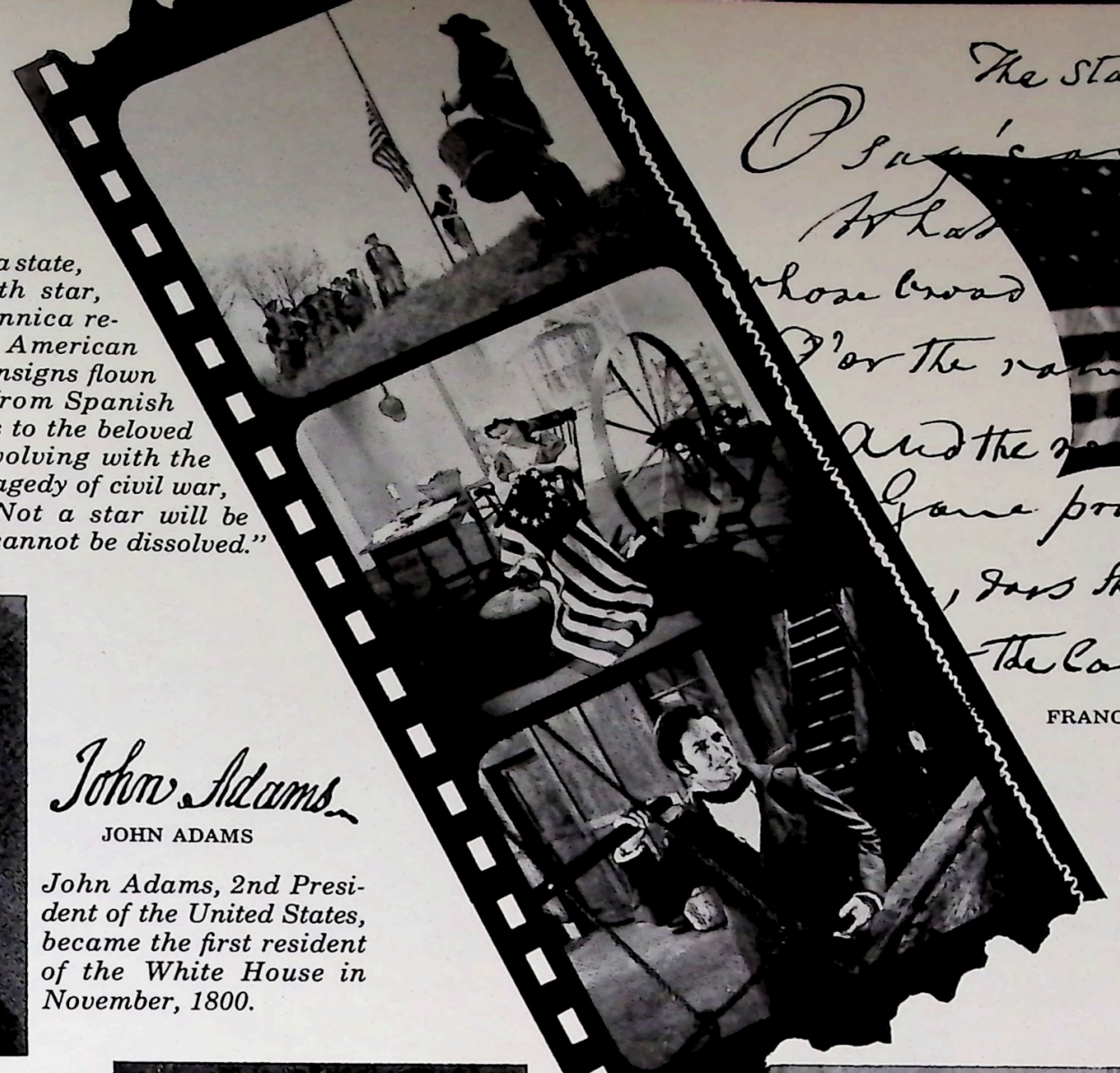
THOMAS JEFFERSON

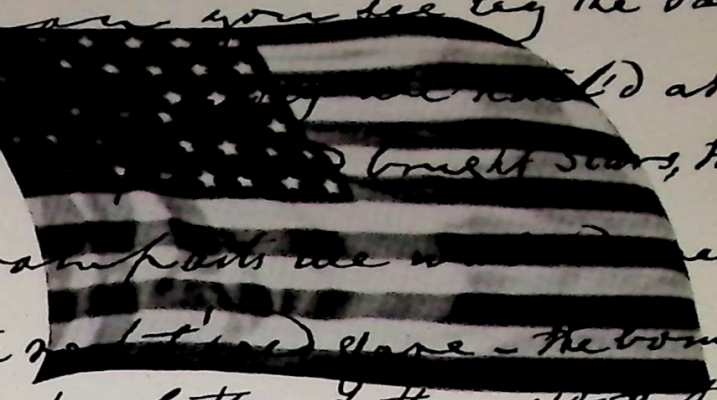
Th Jefferson

*The Constitutional Convention, a gathering of 55 eminent men, met in Philadelphia in May, 1787; under the leadership of George Washington, it drafted the Constitution of the United States.*



*When Hawaii became a state, adding the flag's 50th star, Encyclopaedia Britannica revised the film, "The American Flag," which traces ensigns flown over American soil from Spanish and colonial emblems to the beloved Stars and Stripes, evolving with the nation. Despite the tragedy of civil war, Lincoln declared, "Not a star will be removed; the Union cannot be dissolved."*





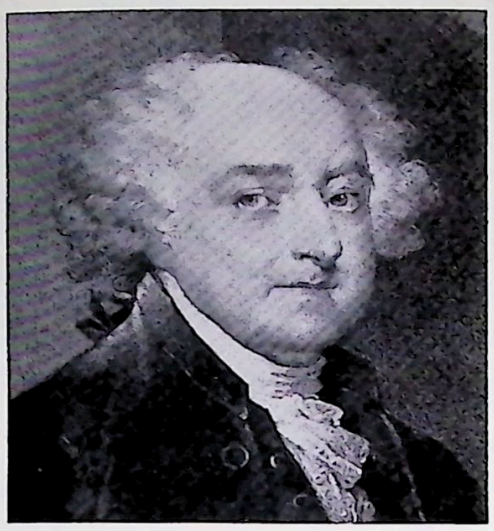
The Star-Spangled Banner.

O say can you see by the dawn's early light
What so proudly we hailed at the twilight's last gleaming
Whose broad stripes and bright stars, through the perilous fight
O'er the ramparts we watched were so gallantly streaming
And the rockets' red glare, the bombs bursting in air
Gave proof through the night that our flag was still there
O say does that Star-Spangled Banner yet wave
O'er the land of the free & the home of the brave

FRANCIS SCOTT KEY

F. S. Key

*Francis Scott Key wrote "The Star-Spangled Banner" in 1814 while detained aboard the British flagship, watching the bombardment of Fort McHenry.*



John Adams

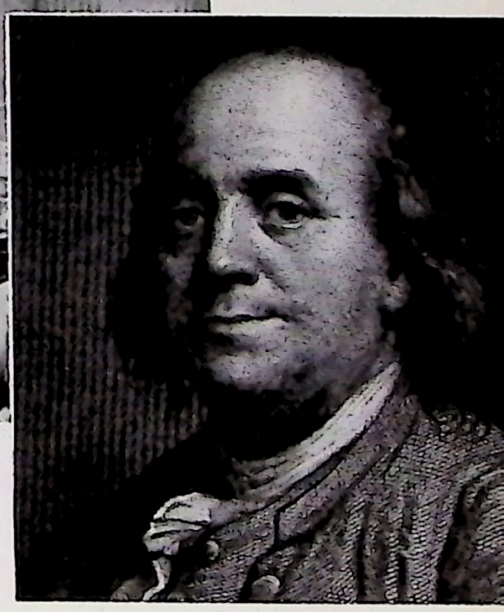
JOHN ADAMS

*John Adams, 2nd President of the United States, became the first resident of the White House in November, 1800.*

James Madison

JAMES MADISON

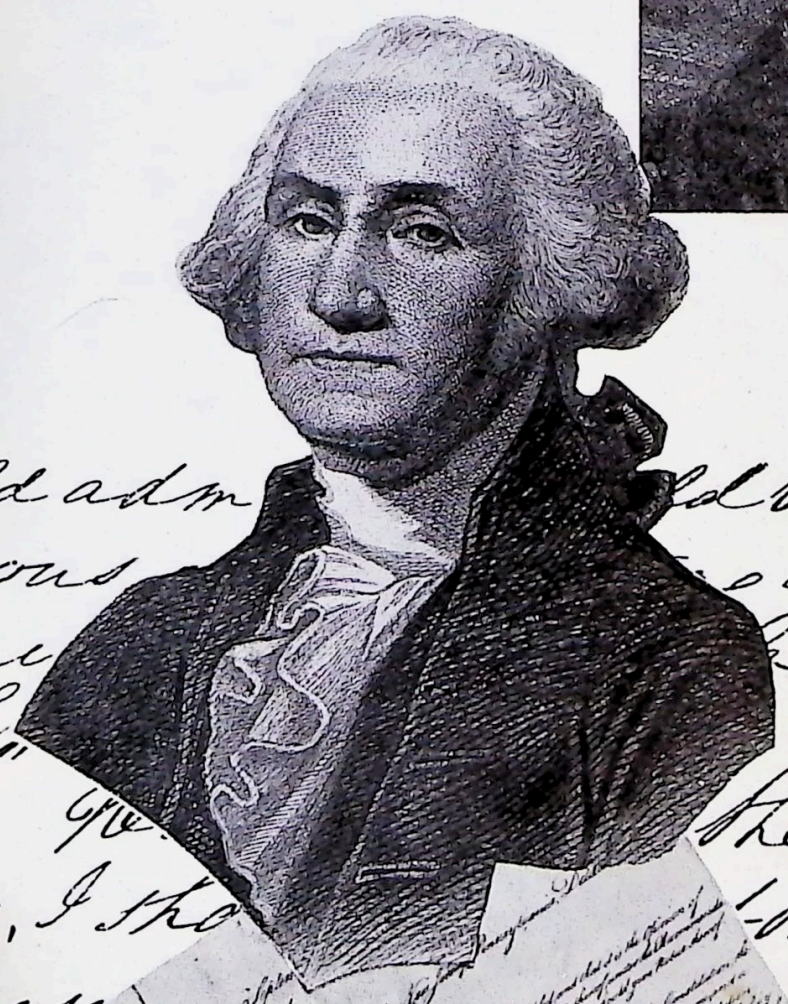
*Nine of the first 10 amendments to the Constitution were based on proposals of James Madison, "father of the Constitution" and 4th President.*



B Franklin

BENJAMIN FRANKLIN

*Benjamin Franklin served his country as a great statesman, writer, scientist and diplomat.*



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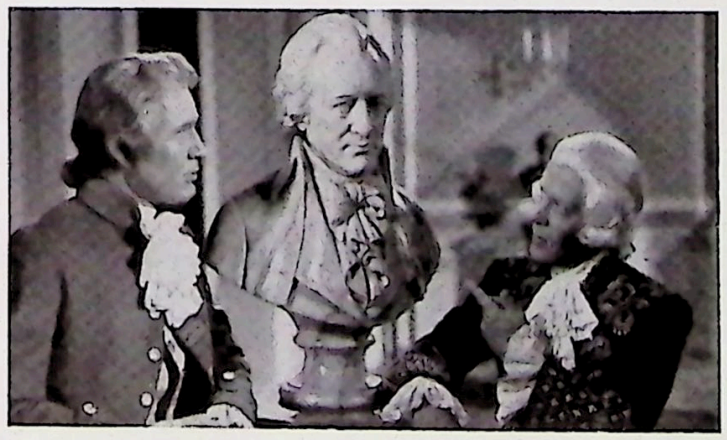
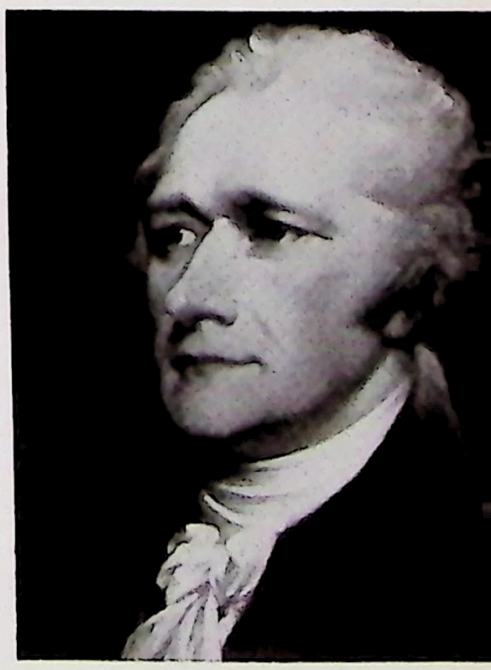
GEORGE WASHINGTON

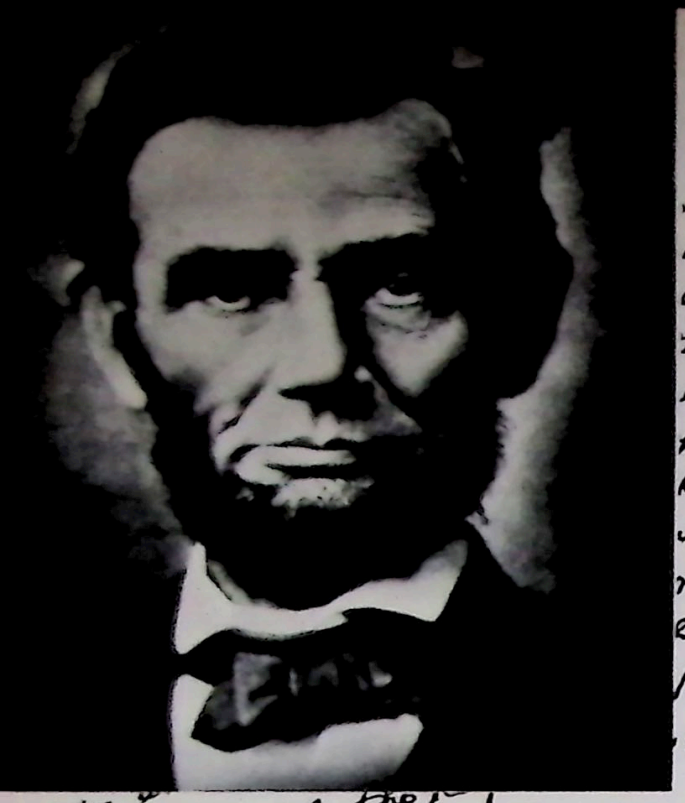


*As Washington's Secretary of the Treasury, Alexander Hamilton set up currency and tax measures to support the government.*



Madam
Your obed & hum Serv
Alexander Hamilton

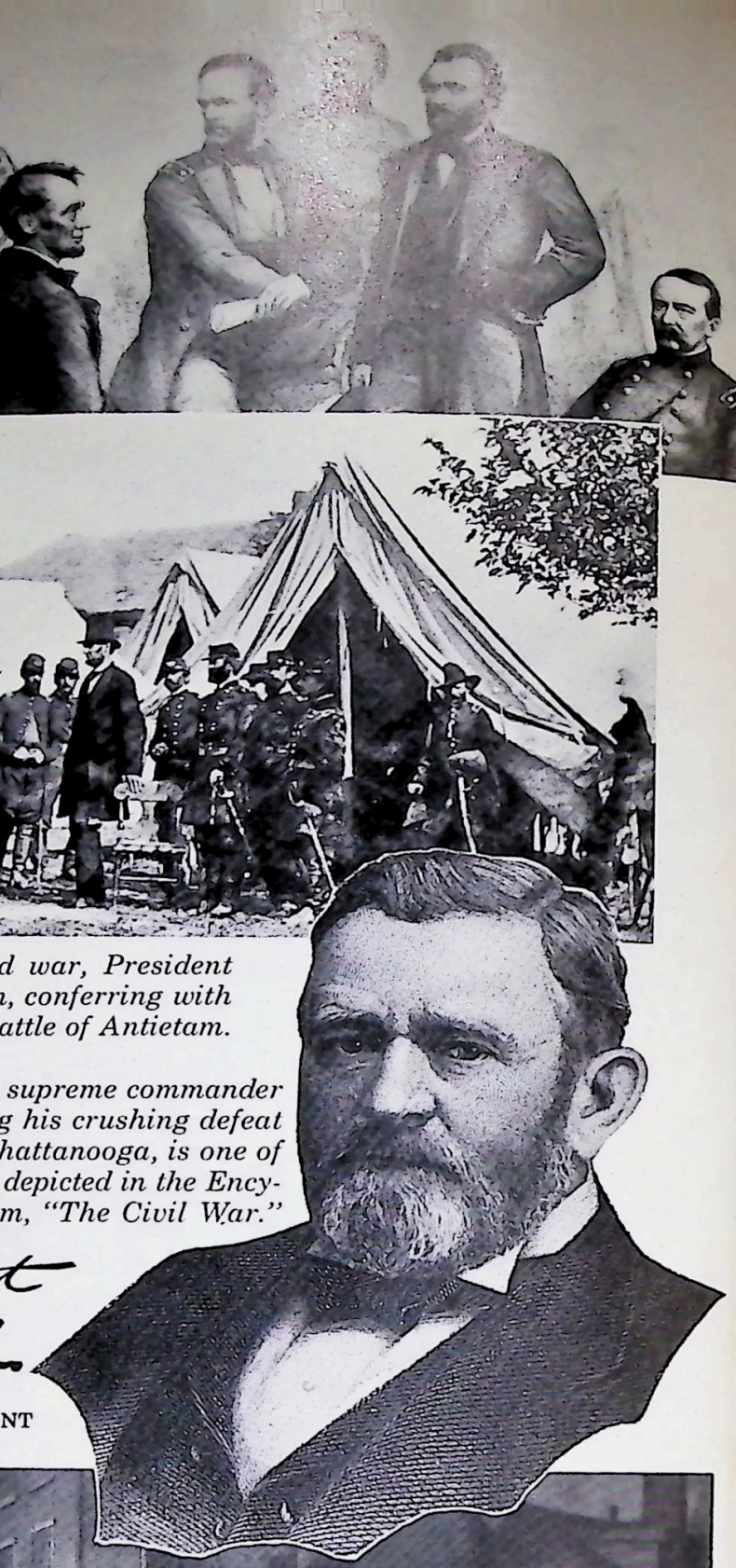
ALEXANDER HAMILTON



ABRAHAM LINCOLN

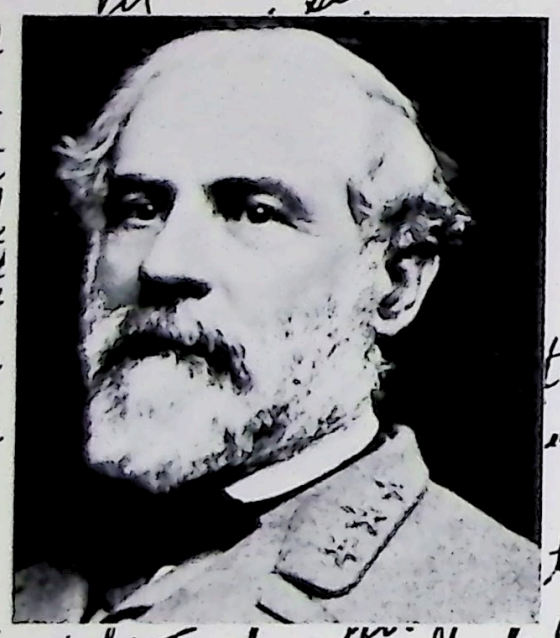
*The film, "Meet Mr. Lincoln," depicts the famous Cabinet meeting at which the Civil War President rallied support for his proposal to issue the Emancipation Proclamation.*

*Deeply troubled by the national schism and war, President Lincoln closely followed the military situation, conferring with General McClellan in the field following the battle of Antietam.*



*Ulysses S. Grant, named supreme commander of Union forces following his crushing defeat of the Confederates at Chattanooga, is one of the great military figures depicted in the Encyclopaedia Britannica film, "The Civil War."*

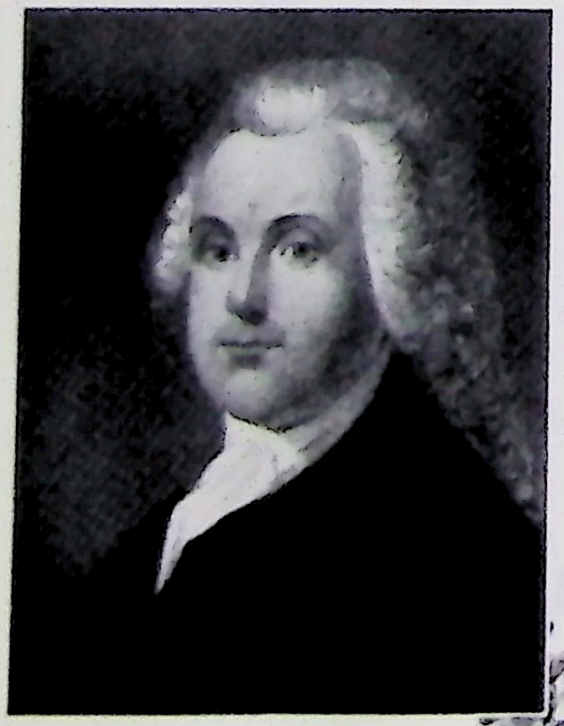
ULYSSES S. GRANT



*Robert E. Lee, one of America's supremely gifted men, believed unswervingly in the constitutionality of the Confederate cause, which until 1865 was still an arguable question.*

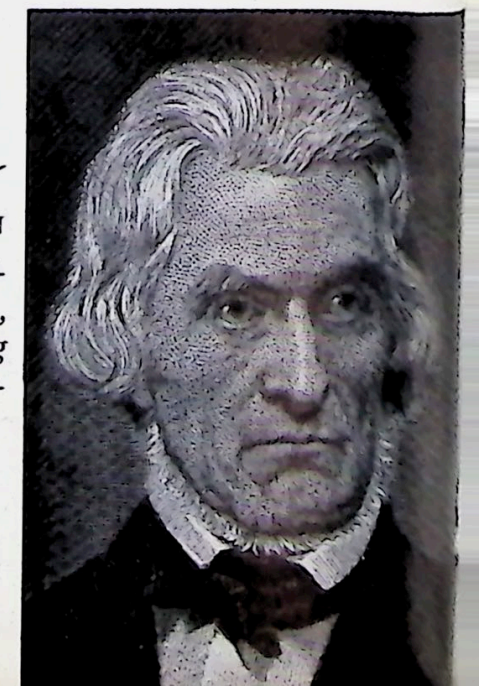
ROBERT E. LEE

*Abraham Lincoln left a legacy of strict adherence to principle, communicated in words of great simplicity and exactness: in his debates with Douglas; in his Gettysburg address, perhaps the greatest democratic pronouncement of all time; in his second inaugural address, appealing for unity after the war.*



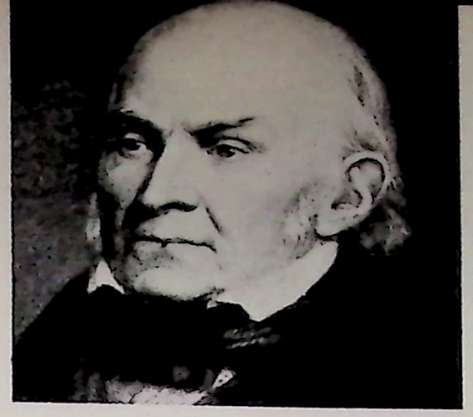
*Roger Williams founded Rhode Island, the first truly democratic colony in the New World, because the Puritans of Massachusetts, although victims of religious persecution, suppressed all freedom of expression.*

ROGER WILLIAMS



JOHN C. CALHOUN

*John C. Calhoun, Vice President under Andrew Jackson, was instrumental in keeping the government from over-centralization of power.*



J. Q. Adams

JOHN QUINCY ADAMS

*John Quincy Adams, as Secretary of State under Monroe prior to his own presidential term, contributed much to the Monroe Doctrine, advancing the cause of freedom on an international basis still followed by free nations.*

*The film, "Susan B. Anthony," one of Encyclopaedia Britannica's comprehensive Builders of America Series, depicts the successful campaign of the crusading Quaker lady to raise the legal status of women and her battle for woman's suffrage, which culminated in the woman's rights amendment to the Constitution after her death.*

J. C. Fremont

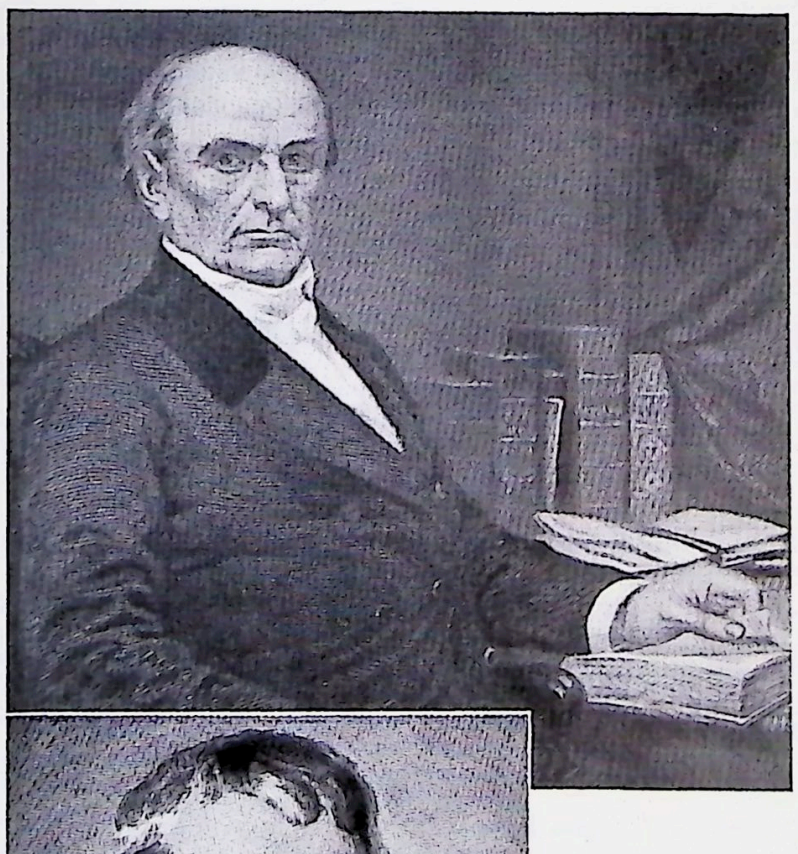
JOHN C. FREMONT

*The "John C. Fremont" film shows how he mapped great unknown Western areas.*

Andrew Jackson

ANDREW JACKSON

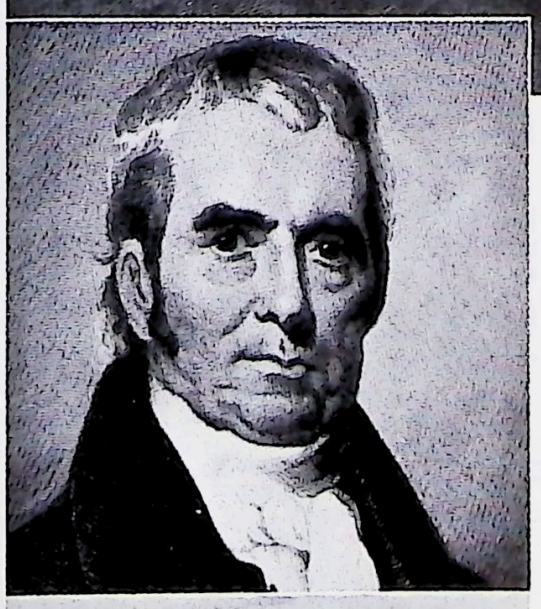
*After 50 years of government by the aristocracy, Andrew Jackson, son of the Carolina frontier and hero of the common man, was elected President as the result of his victory over the British at New Orleans.*

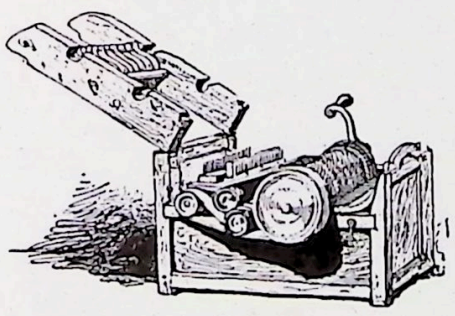


Daniel Webster

DANIEL WEBSTER

*Daniel Webster, eloquent American statesman and lawyer, served as Secretary of State in the Cabinets of 3 Presidents — William Henry Harrison, John Tyler and Millard Fillmore.*





Eli Whitney

ELI WHITNEY

*Eli Whitney's cotton gin, a mechanized means of removing cotton seeds which greatly speeded processing, caused the Southern economy to boom. In building machinery to manufacture muskets, he became a mass production pioneer.*

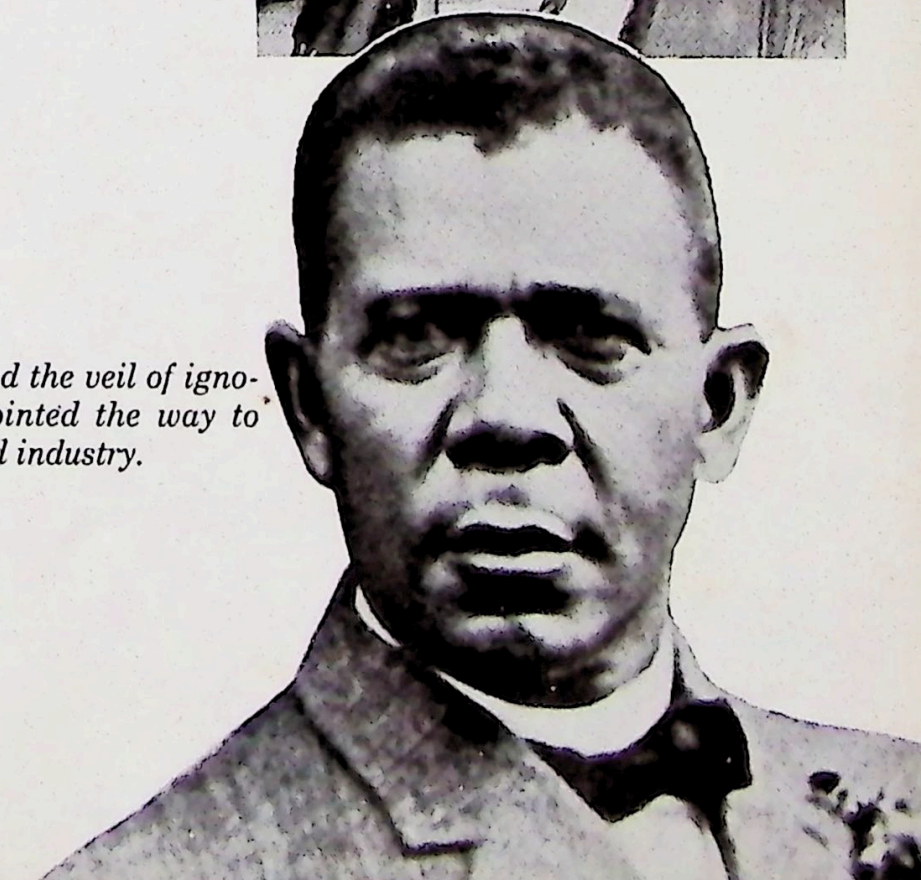
J. Marshall

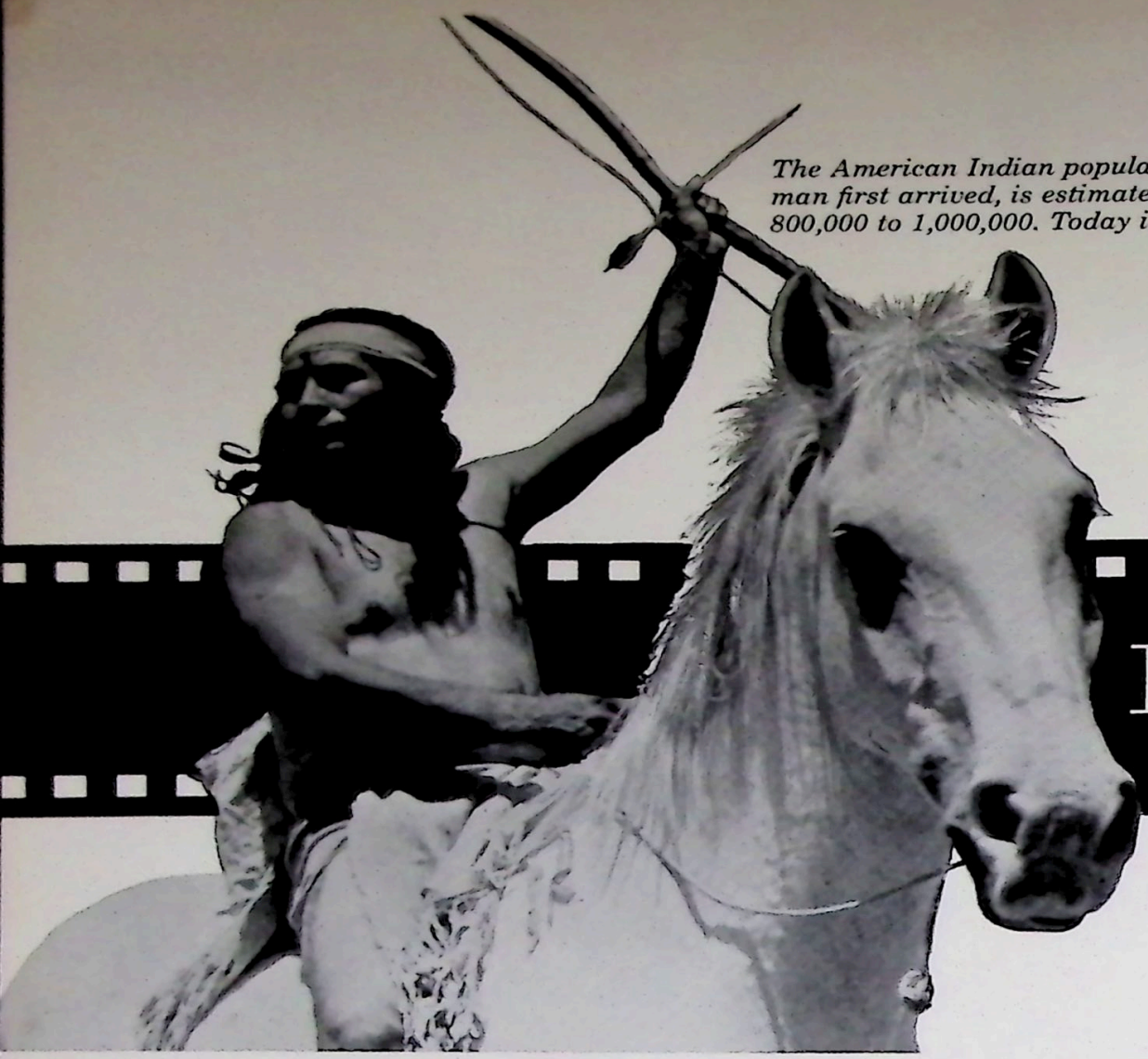
JOHN MARSHALL

*As Chief Justice of the Supreme Court, John Marshall founded American constitutional law, formulating the legal basis for a strong nation.*

*Horace Mann, lawyer, educator and statesman, who played a leading part in establishing the American elementary school system, also improved teaching through the foundation of normal schools.*

*Booker T. Washington—he lifted the veil of ignorance from his people and pointed the way to progress through education and industry.*





*The American Indian population, when the white man first arrived, is estimated to have been from 800,000 to 1,000,000. Today it is 475,000.*

# AMERICAN INDIANS *of Today*

MANY Indian tribes, museums and authorities on Indian lore cooperated with Encyclopaedia Britannica Films in the filming of *Indians of Early America.* Thus, the film presents an unusually broad view of life on the American continent as it was before its settlement by the white man.

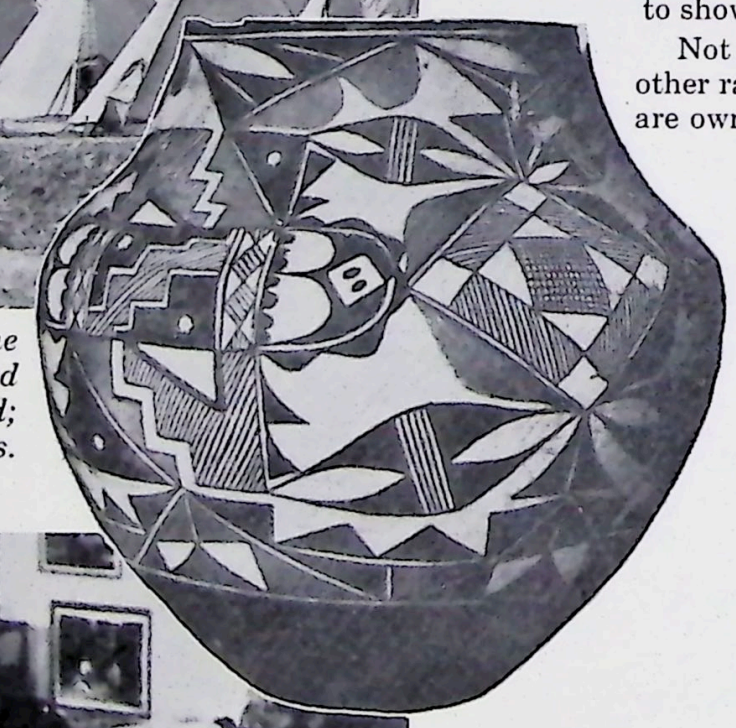
The Iroquois, selected to depict the life of eastern Indians, exhibited a complex political organization and society, in which women had strong influence. The Sioux represent the hunting Indians and the film indicates how the life of the Plains Indian was bound to the buffalo.

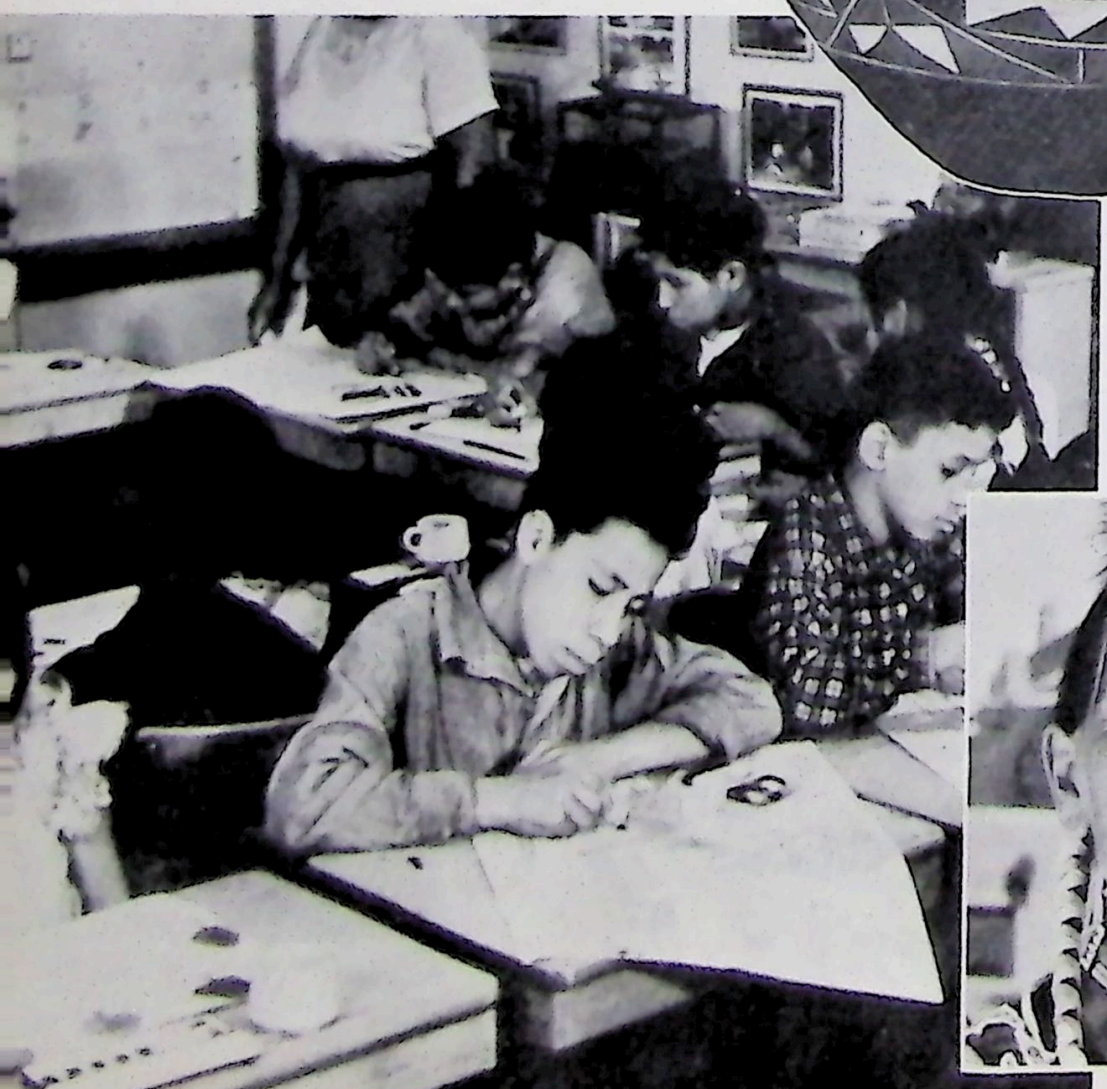
A young Pueblo boy explains how the piled-up houses, called "pueblos" by the Spaniards, were built as a protection from enemies and discloses the ways in which the young were taught farming and pottery making. A "potlatch ceremony" which shows a northwestern chief giving all his goods to his neighbors, who, according to custom, must return better gifts or be shamed, completes the thorough Encyclopaedia Britannica study of Indian life in four sections of the country, offering a broad idea of the immense variety of cultural patterns and customs of the American Indian.

The Encyclopaedia Britannica film, *American Indians of Today,* photographs the Andrews family of San Carlos Apache Reservation in Arizona, to show the everyday life of the modern Indian.

Not long ago, the Apaches leased their land and rode the range for other ranchers; today, they not only have a tribal herd of cattle, but herds are owned by individual families. George Andrews, manager of the tribal

*Tepees made of hides provided shelter for the Plains Indians. The tribe hunted buffalo and depended on them for all things: meat for food; bones for weapons; skins for clothing and tents.*

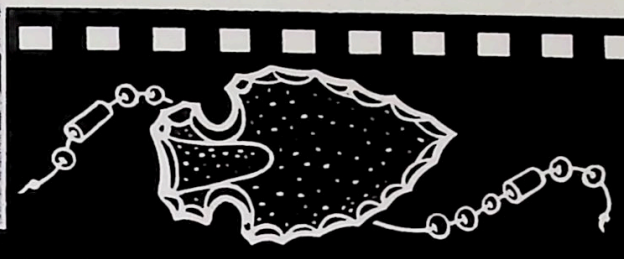




*Many Indian youngsters of today become interested in professional careers as doctors, lawyers, artists, nurses or teachers.*

*One of New Mexico's most beautiful pueblos is at Taos, where the many storied apartment-type earthen houses date from before Columbus. To thwart invaders, entrances are reached by retractable ladders.*

*Scientists believe that hunting parties from Asia, crossing open valleys through Siberia, Canada and the Yukon to the western plains of the United States during the Ice Age, are the ancestors of American Indians.*



cattle herd, lives in a small but comfortable house. His wife's mother still wears old-fashioned dress and does not approve of their new way of living; the other family members, especially the children, prefer it. Before the camera turns to the legal status of Indians, information about their numbers and the locations of reservations, it shows how the Apaches govern themselves through a tribal council.

The film shows different tribes living on their reservations—the Sioux in South Dakota, who are having great difficulty adjusting to farm life because of their hunting background; the Senecas of New York, who have a tradition of farming and are making a success of their land; the life of the Seminoles in the Florida Everglades; the Zuni, who continue their age-old art of creating jewelry; and the Navajos, who comprise the largest tribe in the country.

*American Indians of Today* also depicts the government's relocation program, which encourages Indian families to settle in cities and shows how a typical family makes the move successfully, while many fail to adapt themselves to city life and return to the reservations. The film explains the education available to 120,000 Indian children in public and federal schools—one of the important keys to the future of the American Indian.

History comes alive again for students viewing these films as they watch the proud red man step out of the pages of history and relive a vital part of America's rich past. ♦

*In the rhythmic eagle dance of the pueblo dwellers, the men simulate graceful flying movements with their feather-covered arms.*

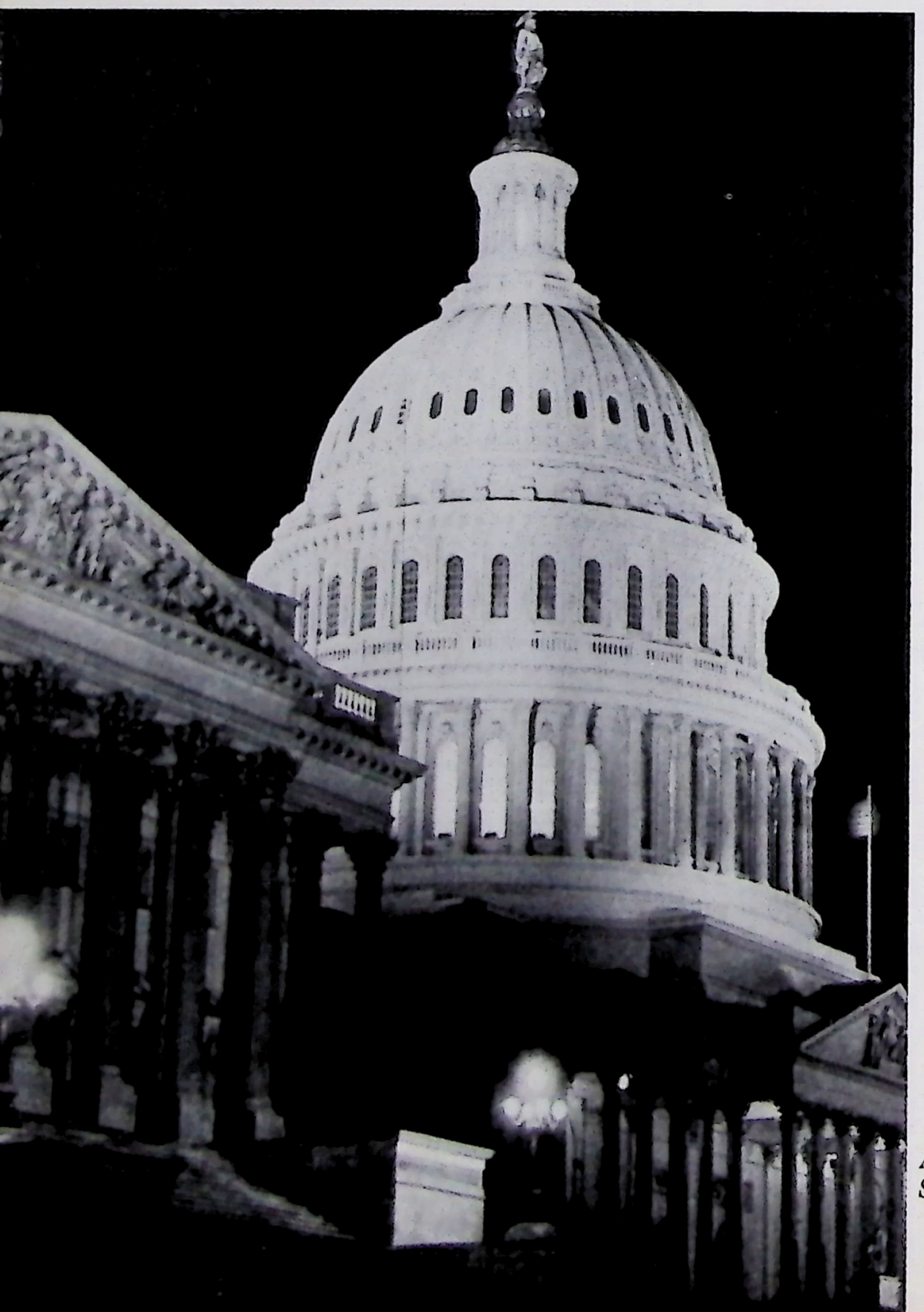
*The Navajos, who live in New Mexico on the world's largest reservation, are among the finest Indian silversmiths, despite their crude tools. A hundred years ago, they learned silverwork from the Mexicans, adding their own ideas to make lovely, distinctive designs.*

*The mother or grandmother passes along the ancient art of pottery making; the different shapes for water, corn, cooking and eating; creating a different design for each vessel based on typical tribal and family patterns.*

*Time and distance are no barriers to Encyclopaedia Britannica cameramen, who take whole classrooms of students to Washington on film to see the evolvement of the legislative, executive and judicial powers of the United States government.*

# the President ★ the Congress ★ the Supreme Court

## CIVICS *and* GOVERNMENT



*A beautiful and beloved symbol of democracy, the United States capitol had its cornerstone laid by George Washington.*

A NEW insight into American government, its functions, checks and balances, limitations and powers, is gained by students through viewing three dramatic Encyclopaedia Britannica films included in the civics and government series—*The President, The Congress* and *The Supreme Court.*

The classroom film, *The President,* discloses how the office of the Presidency has evolved and changed due to the varying demands made upon it and the individual character of the man in office. As Chief Executive, the President directs the activities of more than two million federal employees, appointing and removing top officials of this vast administrative network and directing the work of federal agencies through Cabinet meetings and conferences with department heads.

The President's legislative power is seen in the filmed presentation of his legislative program to Congress, his veto power, his influence as leader of his party, his power of appointment of federal officials and, especially, through his unique opportunity to mold public opinion.

In the Encyclopaedia Britannica film, *The Congress,* is re-enacted the way citizens at home begin the passage of a law, by showing a flood-devastated community whose citizens demand federal action for flood control. A delegation calls on the local Congressman campaigning for re-election and obtains his promise of action on the program. When he is re-elected, the camera follows him to Washington, where it is seen that while the formal decisions on legislation are made in the House and Senate, most of the actual work is done in Congressional committees. The bill is introduced in the House, and referred to the Committee on Public Works, where its support is gained; it is debated, decided upon favorably, sent to the House, passed, sent to the Senate, where the same process is repeated, and finally becomes a law formally, by receiving the President's signature.

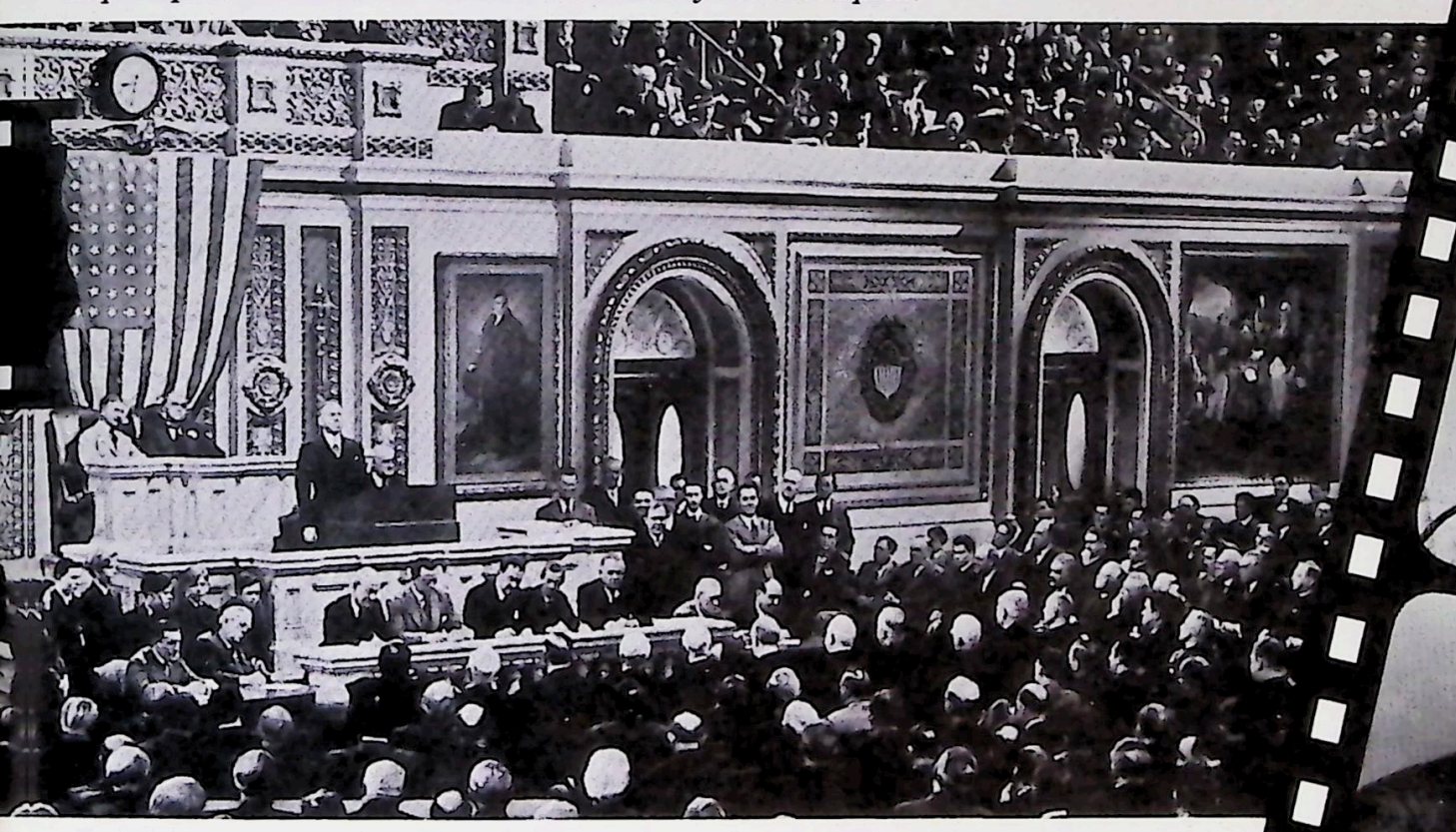
A series of scenes depicting the momentous decisions which established the powers of the federal government for all time—as against those of the states—highlights *The Supreme Court* film and reveals the growth of the Court's powers. It is shown that through a series of historic battles, the Court has come to its present position of eminence and power, serving boldly as the guardian of the rights of citizens under the Constitution.

No textbook alone could provide the real understanding of the historical background and functions of United States government which conscientious teachers are able to impart, with the firm foundation of clear, vital information contained in these Encyclopaedia Britannica films. ♦

*George Washington's 8 years as president were marked by the same caution, precision and judgment that brought agreement to the Constitutional Convention under his leadership.*

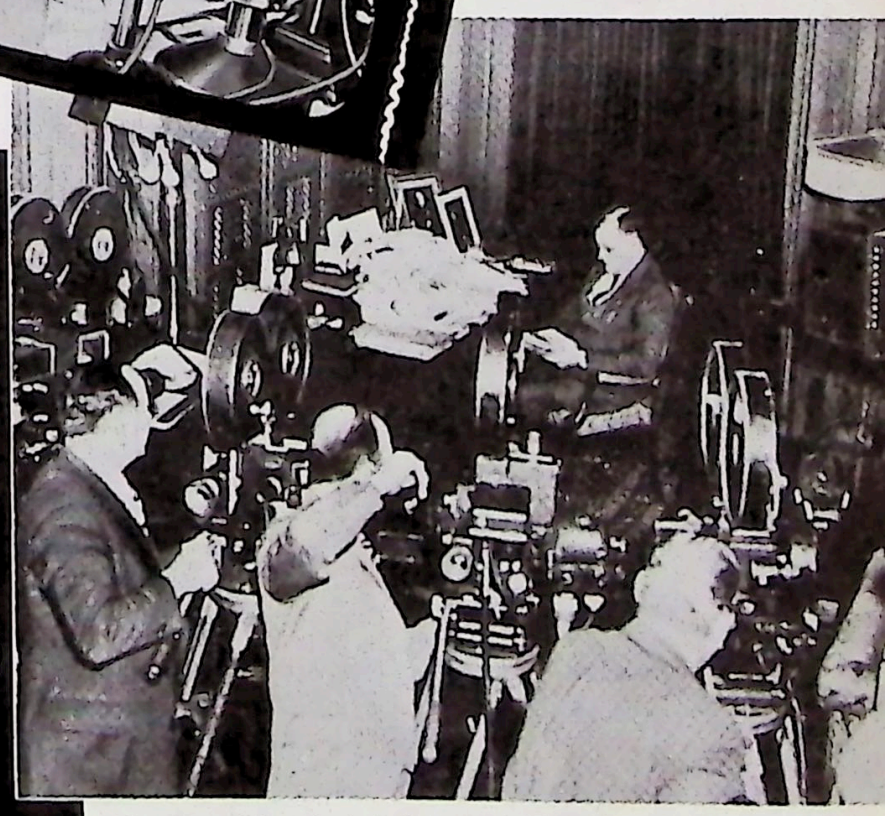
*During the Civil War, Abraham Lincoln, with the assistance of his Cabinet, not only helped to save the Union, but also added permanently to the strength of the Presidency.*

*At each session of Congress, the President presents a legislative program and his supporters in Congress introduce bills embodying this program. "The President" depicts how, during World War I, presidential powers were broadened, putting the President in a position of world leadership—a position that has become continually more complex.*

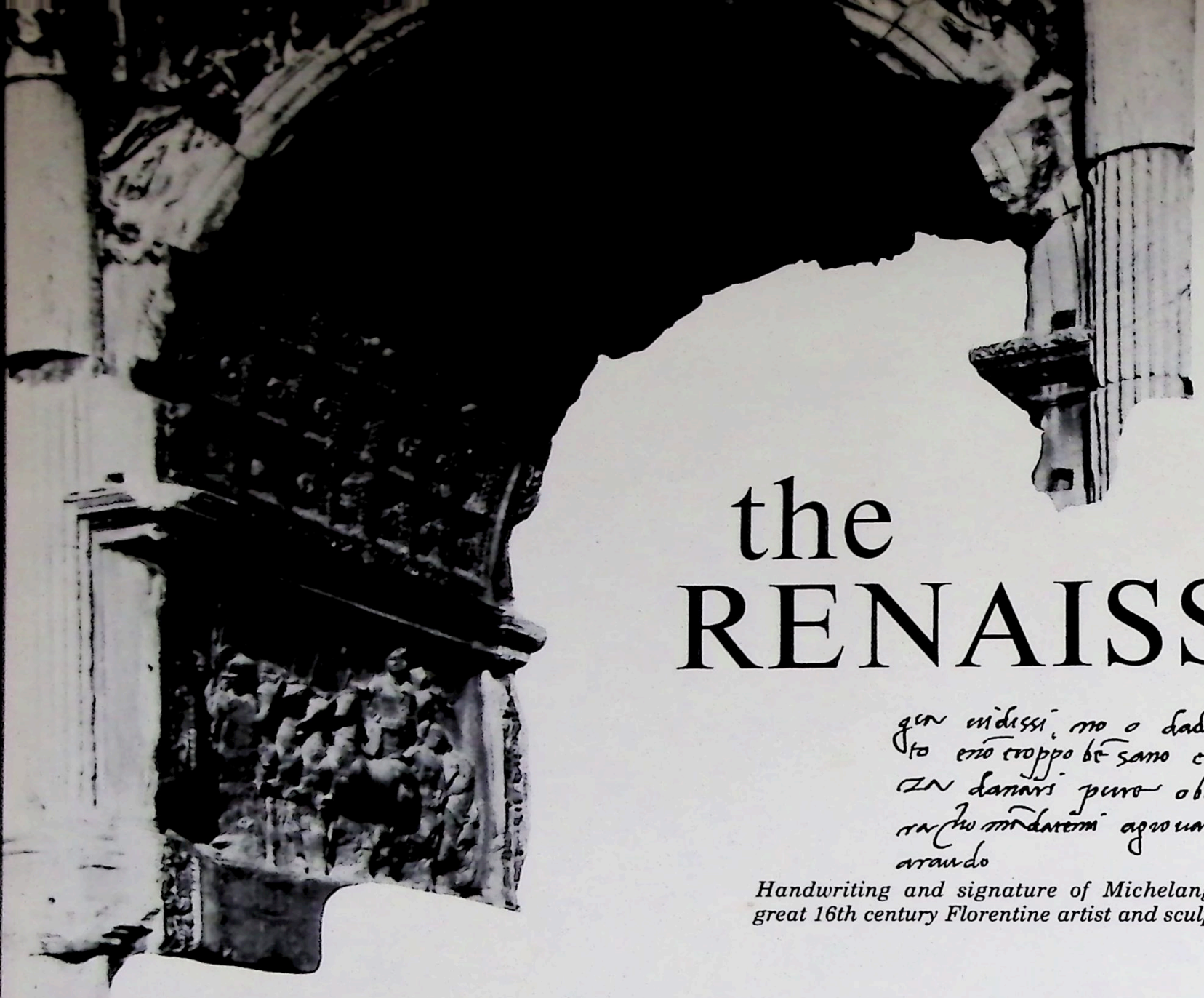


*Presidents Dwight D. Eisenhower, Harry S. Truman and Franklin D. Roosevelt had to deal with such problems as a great depression, world war, cold war, limited war, and inflation. In a loquaciously communicative age, they kept the public better informed as to national and world affairs.*

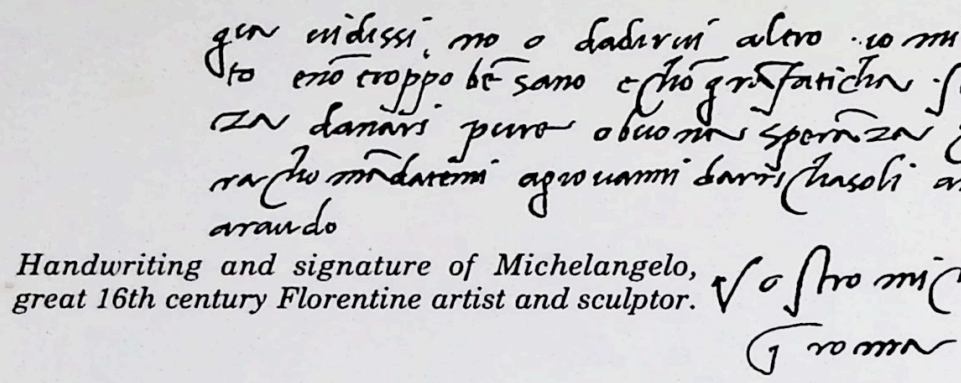
*The film, "The Supreme Court," discloses the duties assigned it by the Constitution —duties that did not originally include the power to declare acts of Congress and the President unconstitutional.*



*The President's job has not only grown more complex over the years, but has come under close public scrutiny. Modern communications, especially motion pictures, bring presidential views to the world in minutes.*



# the RENAISSANCE



*Handwriting and signature of Michelangelo, great 16th century Florentine artist and sculptor.*

THAT great resurgence of intellectual curiosity and achievement, manifested in rediscovery of the classical culture of Rome and the emergence of a brilliant new culture, is revealed in all its grandeur in the Encyclopaedia Britannica World History Series film, *The Renaissance.* Photographed entirely on location in Italy and France, the balancing of all aspects of the film has been so well done under the direction of Producer John Barnes that teachers in at least three major study areas — world history, art and the history of art and music — have found it an unsurpassable teaching implement.

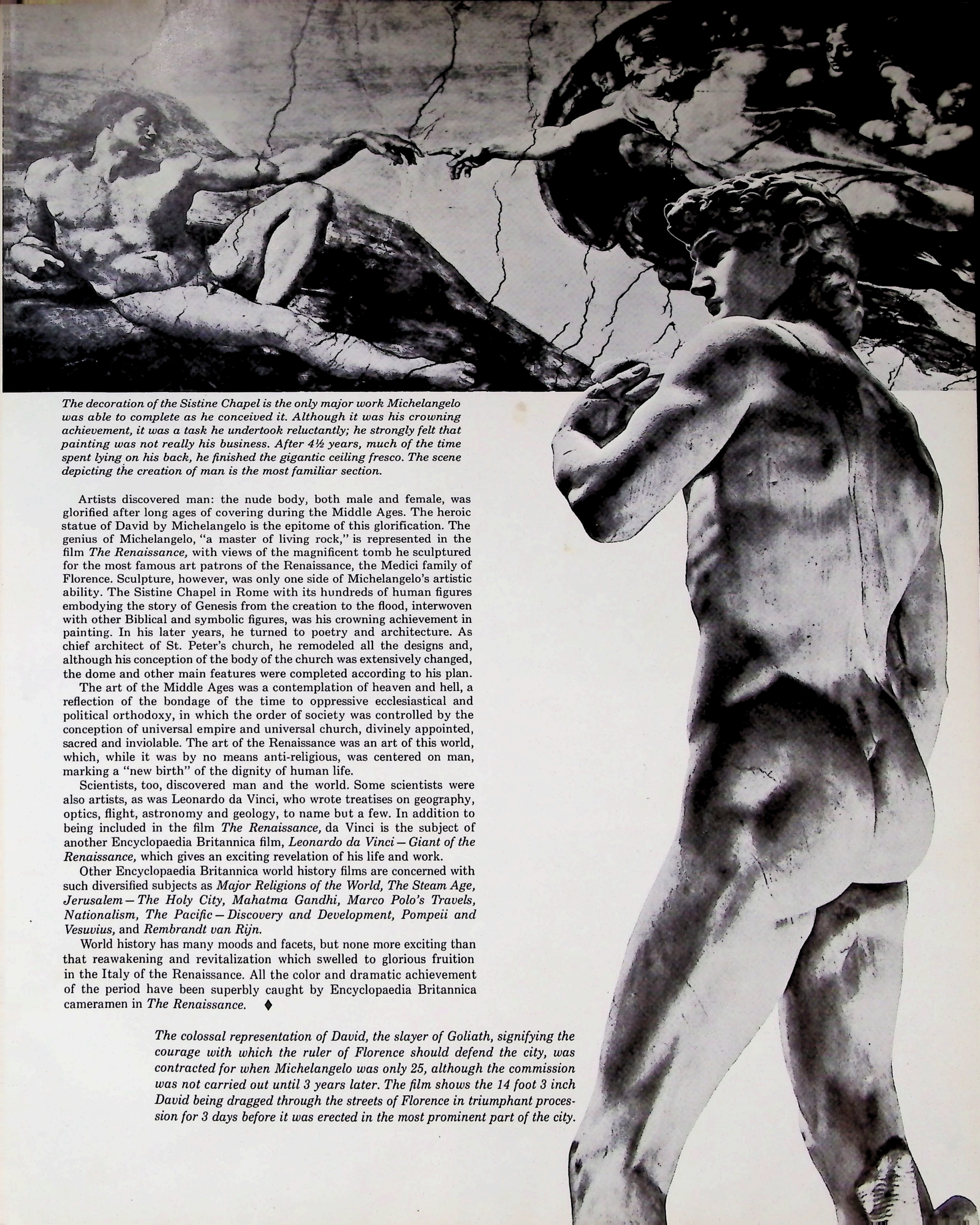
The music for *The Renaissance* is without question one of the finest scores ever included in any film. Beautifully recorded by the outstanding choral and instrumental groups of England and continental Europe the music adds a striking dimension of sound to great works of art outstandingly photographed. The brilliant musical works were carefully selected to blend with the film. For example, when the sculpture of Chartres Cathedral lights up the screen, the Brompton Oratory Choir is heard singing vocal music from an early Chartres manuscript.

*The Renaissance* traces the rise of intellectual stirrings in the Italian city of Florence, explaining the reasons for it and the directions it took. The fall of the Roman Empire marked the beginning of the Middle Ages, a period during which life was centered about the church and the walled castle. Life during this period is depicted in other outstanding Encyclopaedia Britannica world history films: *The Medieval Crusades, The Medieval Gilds, The Medieval Knights* and *The Medieval Manor.*

Change from this primarily unenlightened era came slowly over a period of centuries, the "new birth" commencing in Italy because of its strategic location across the routes of the Crusades. Italian ships carried the crusaders to the Holy Land — at a profit. Merchant ships from Venice and Genoa plied the world's trade routes, bringing influences from northern Europe and the Near East. With the new wealth and leisure brought to the city-states, the noblemen of Italy became patrons of the arts, preparing the way for the discovery of the world and of man.

The glories of the expired Roman Empire had never been quite forgotten and this fact, too, was a determinant in the location of the new cultural up-swing, for it was the ancient world that was discovered first — the civilization of ancient Greece and Rome were virtually unknown except to a few isolated scholars during the Middle Ages. When the Roman Empire fell, many achievements in art and architecture were buried under rubble. Achievements in science, philosophy and literature were half-forgotten. Renaissance scholars and artists literally dug these out of the ruins and a passion for the learning of the ancient world swept Italy. There had been some continuity of civilization in previous times, from Egypt through Greece and Rome, and the men of the Renaissance reasserted this continuity.

*Filmed entirely in Europe by Encyclopaedia Britannica camera crews, "The Renaissance" visits the living, bustling museum that is Rome, custodian of the genius of the classical and Renaissance eras—The Eternal City, ever one with the past and the present, a montage of history, art and architecture.*



*The decoration of the Sistine Chapel is the only major work Michelangelo was able to complete as he conceived it. Although it was his crowning achievement, it was a task he undertook reluctantly; he strongly felt that painting was not really his business. After 4½ years, much of the time spent lying on his back, he finished the gigantic ceiling fresco. The scene depicting the creation of man is the most familiar section.*

Artists discovered man: the nude body, both male and female, was glorified after long ages of covering during the Middle Ages. The heroic statue of David by Michelangelo is the epitome of this glorification. The genius of Michelangelo, "a master of living rock," is represented in the film *The Renaissance,* with views of the magnificent tomb he sculptured for the most famous art patrons of the Renaissance, the Medici family of Florence. Sculpture, however, was only one side of Michelangelo's artistic ability. The Sistine Chapel in Rome with its hundreds of human figures embodying the story of Genesis from the creation to the flood, interwoven with other Biblical and symbolic figures, was his crowning achievement in painting. In his later years, he turned to poetry and architecture. As chief architect of St. Peter's church, he remodeled all the designs and, although his conception of the body of the church was extensively changed, the dome and other main features were completed according to his plan.

The art of the Middle Ages was a contemplation of heaven and hell, a reflection of the bondage of the time to oppressive ecclesiastical and political orthodoxy, in which the order of society was controlled by the conception of universal empire and universal church, divinely appointed, sacred and inviolable. The art of the Renaissance was an art of this world, which, while it was by no means anti-religious, was centered on man, marking a "new birth" of the dignity of human life.

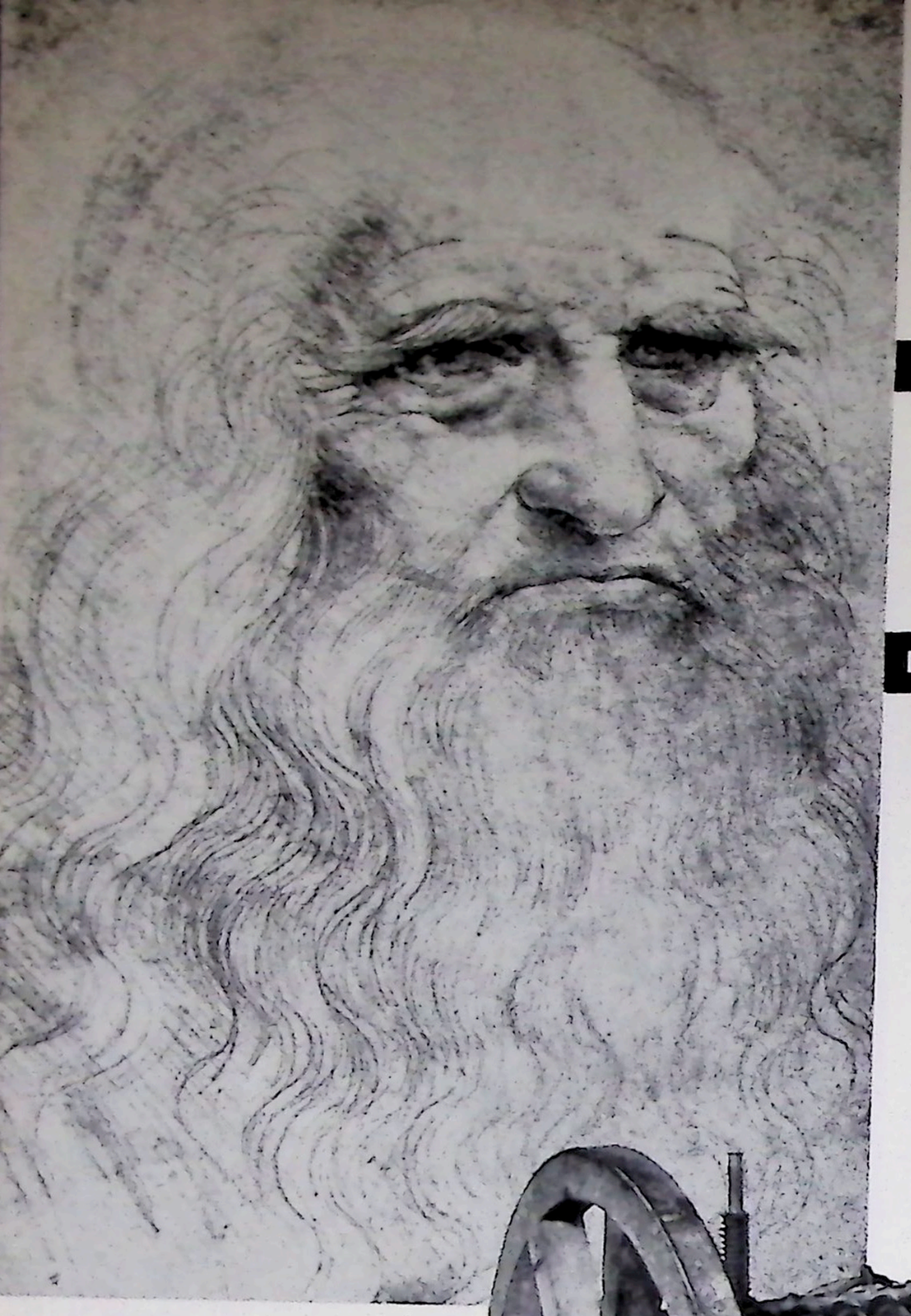
Scientists, too, discovered man and the world. Some scientists were also artists, as was Leonardo da Vinci, who wrote treatises on geography, optics, flight, astronomy and geology, to name but a few. In addition to being included in the film *The Renaissance,* da Vinci is the subject of another Encyclopaedia Britannica film, *Leonardo da Vinci — Giant of the Renaissance,* which gives an exciting revelation of his life and work.

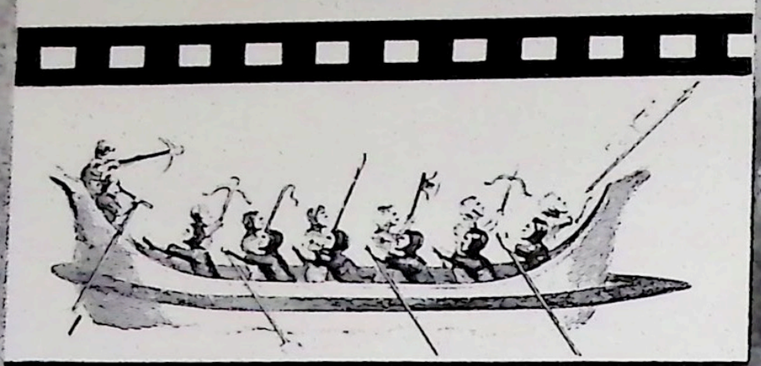
Other Encyclopaedia Britannica world history films are concerned with such diversified subjects as *Major Religions of the World, The Steam Age, Jerusalem — The Holy City, Mahatma Gandhi, Marco Polo's Travels, Nationalism, The Pacific — Discovery and Development, Pompeii and Vesuvius,* and *Rembrandt van Rijn.*

World history has many moods and facets, but none more exciting than that reawakening and revitalization which swelled to glorious fruition in the Italy of the Renaissance. All the color and dramatic achievement of the period have been superbly caught by Encyclopaedia Britannica cameramen in *The Renaissance.* ♦

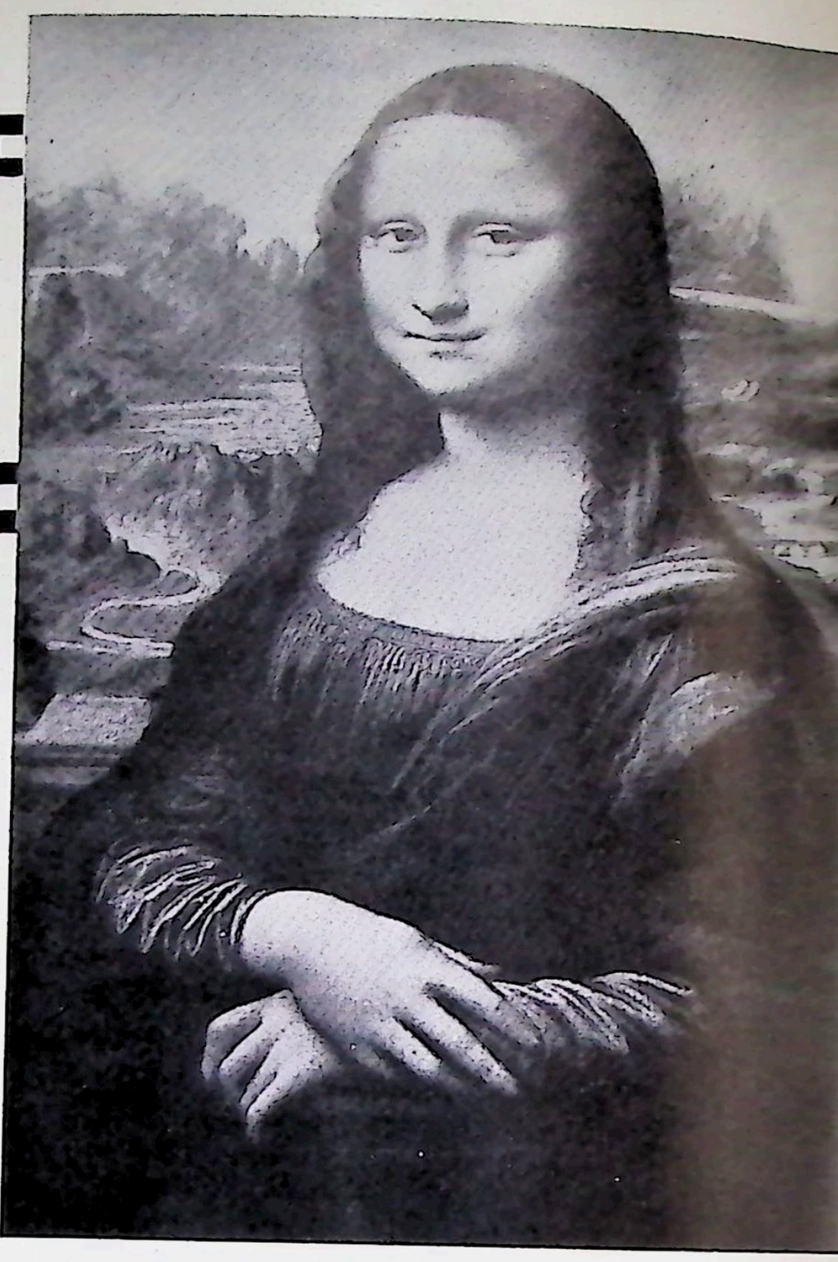
*The colossal representation of David, the slayer of Goliath, signifying the courage with which the ruler of Florence should defend the city, was contracted for when Michelangelo was only 25, although the commission was not carried out until 3 years later. The film shows the 14 foot 3 inch David being dragged through the streets of Florence in triumphant procession for 3 days before it was erected in the most prominent part of the city.*

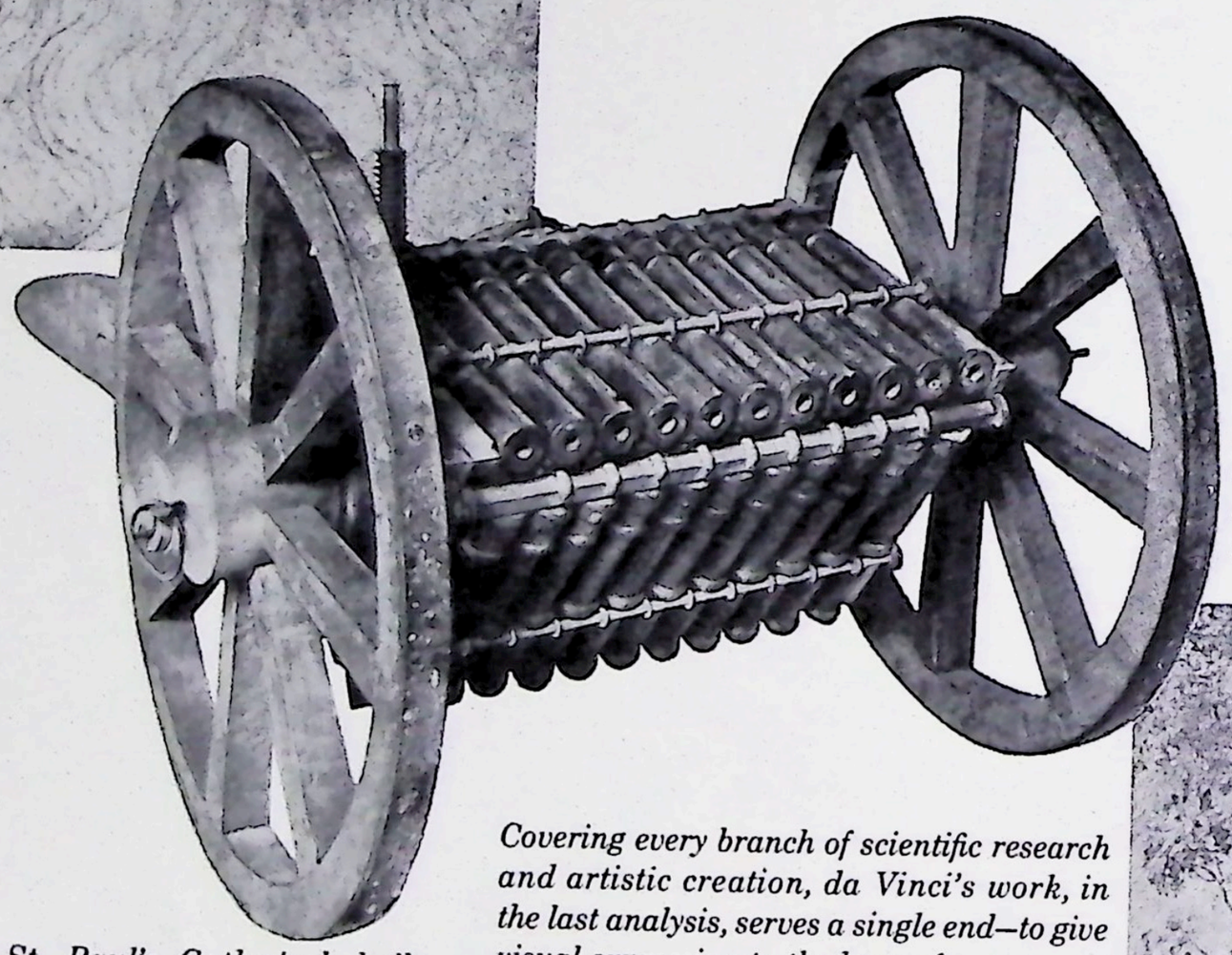
*The great Italian painter, sculptor, architect, musician, scientist and engineer in the self-portrait at left is Leonardo da Vinci, son of a Florentine lawyer. A handsome, vital man with winning charm, he had an inexhaustible intellectual curiosity and all-encompassing aptitudes. With such diversification of interest, his production in any one field was limited.*





*The haunting "Mona Lisa" smile has been called symbolic of the enigma of the universe which da Vinci spent his life trying to solve. The painting's unbelievably fine brush work caused a critic to comment that the beauty of the face seemed to have been built up cell by cell from the inside, with an infinite number of glazes, each delicate as a breath.*

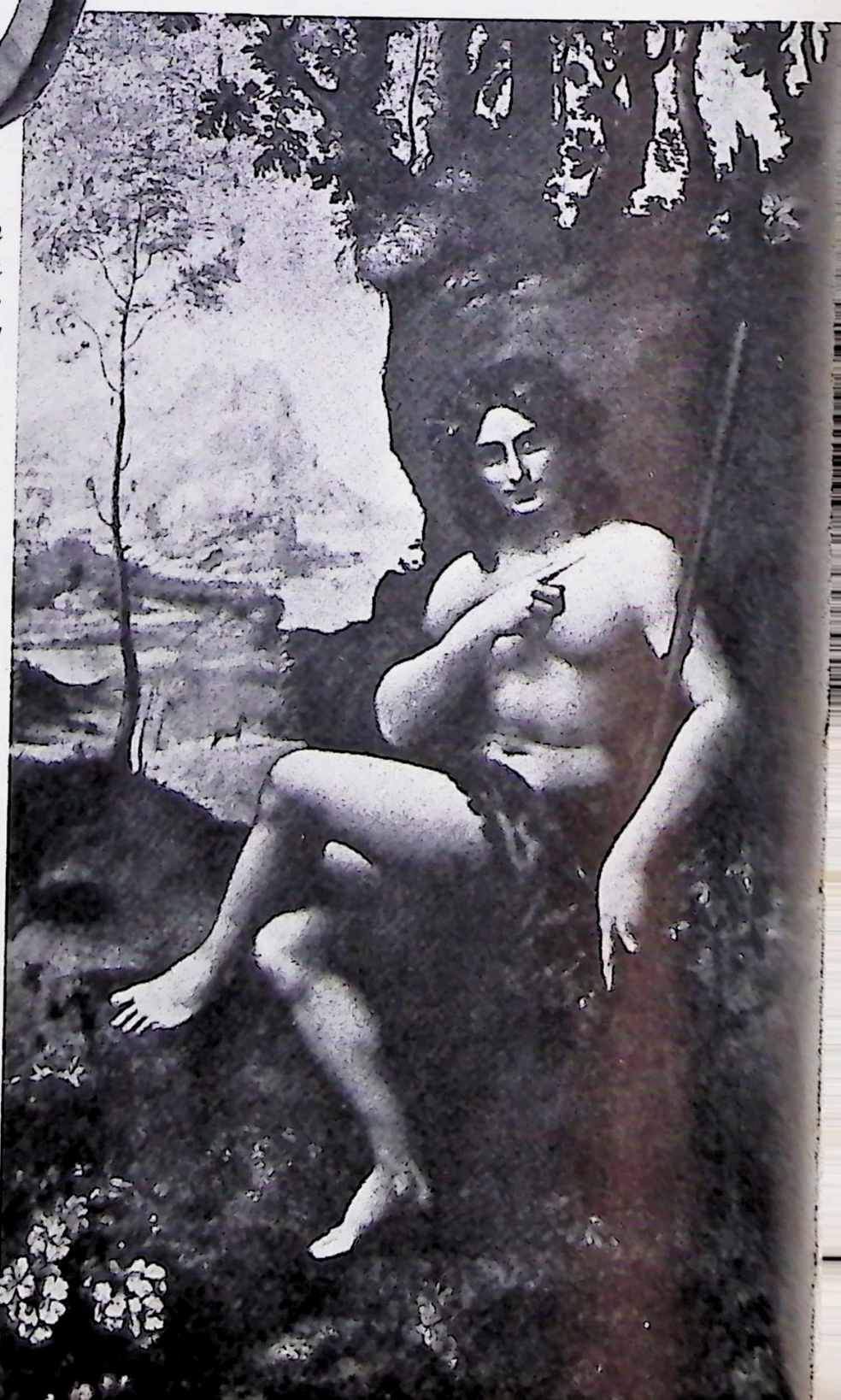




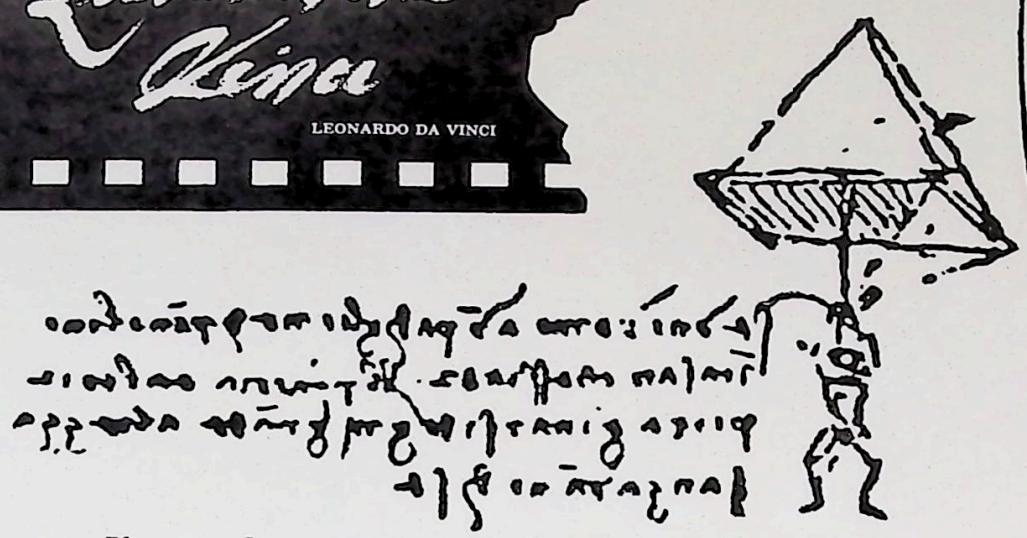
*A multi-barrelled gun, artillery invention of Leonardo da Vinci, anticipated modern rapid-fire and rocket guns. Such weapons were so far in advance of their time that even the first "mitrailleuses" of the 19th century were basically no more advanced than this conception of da Vinci's.*

*Covering every branch of scientific research and artistic creation, da Vinci's work, in the last analysis, serves a single end—to give visual expression to the laws of nature and the beauty of the world.*

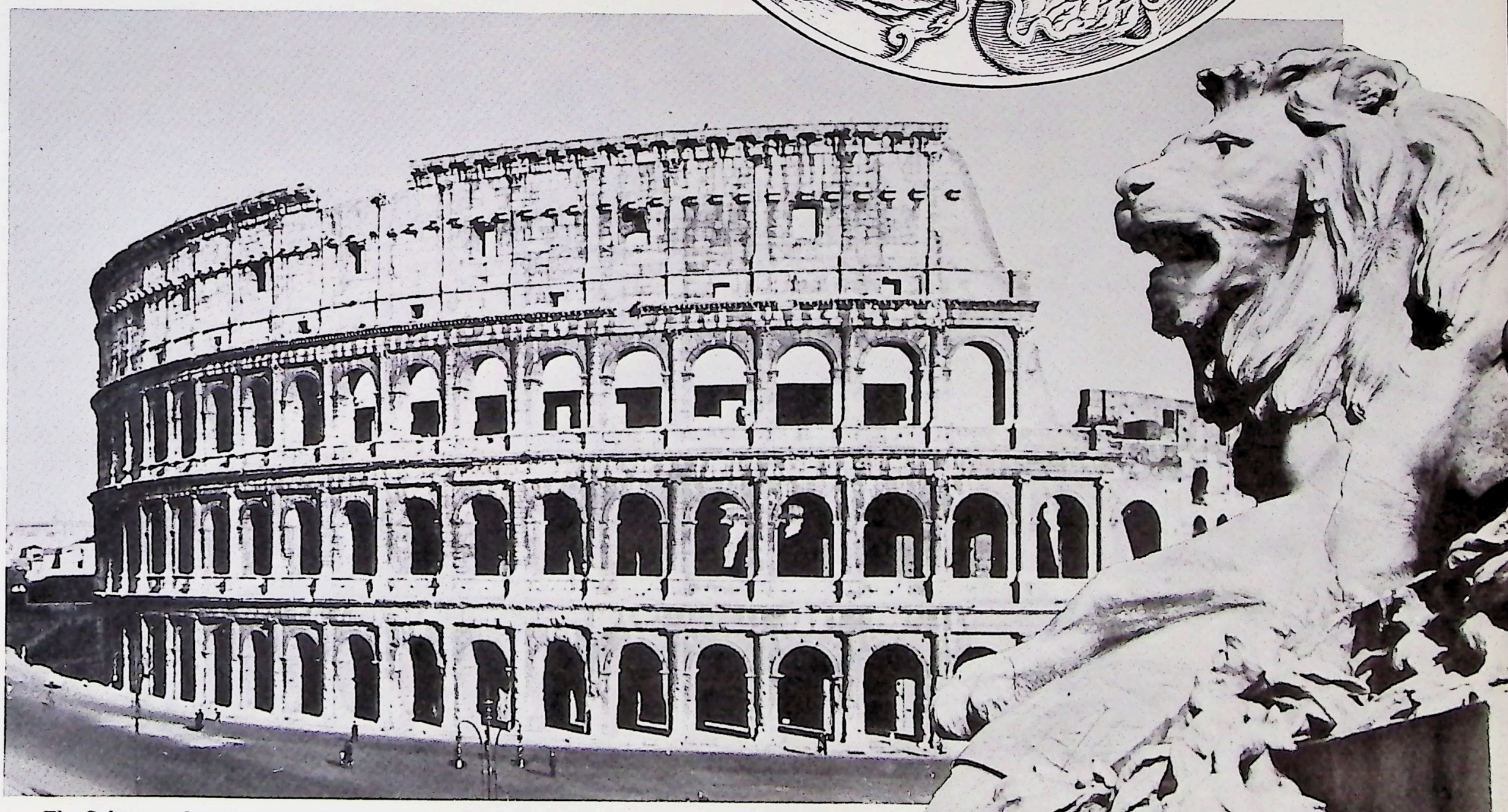
*The interior of St. Paul's Cathedral, built around 1790, indicates the extensive use of the dome by Renaissance architects.*



*The Italians of the 14th century, more precocious than other Europeans, were ripe for intellectual emancipation, seeking learning that was no longer the prerogative of a special and recluse class. Learning grew fashionable, pervading all society, and spawned the work of such artists as Giotto, Raphael, da Vinci, Titian, Correggio; the sculpture of Donatello, Michelangelo.*



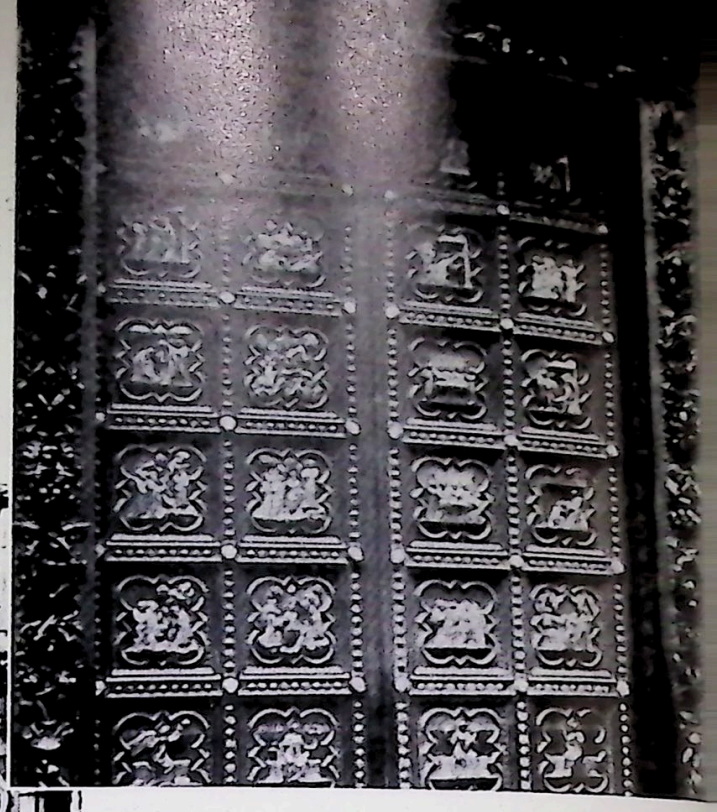
*If a man have a tent . . . 12 ells across and 12 deep, he can throw himself from any height without injury.*—LEONARDO DA VINCI

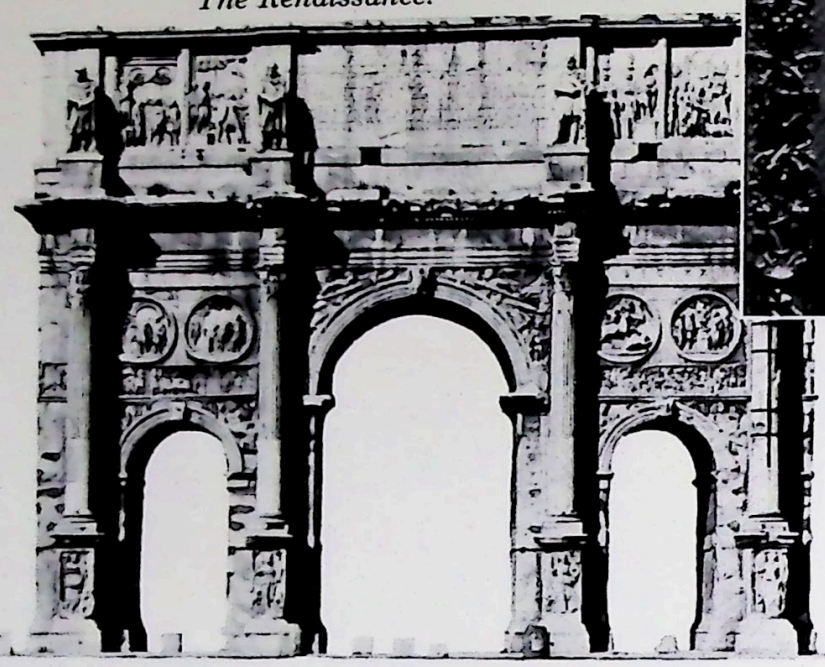


*The Colosseum has surmounted all periods of history for almost 20 centuries. A part of all the colorful tapestry of time to the present, the classical amphitheatre was witness to the pagan rites of ancient Rome and saw the martyred beginnings of Christianity in Europe; it watched the decline of learning during the Middle Ages and its resurgence with the Renaissance. Inaugurated in 29 A.D., it is constructed of travertine and concrete and probably seated 50,000 people.*

*As the official architect of Florence for the two years prior to his death, Giotto designed the detached campanile for the cathedral. He is known as the great humanizer of painting.*

*The extraordinarily beautiful doors of the baptistry in Florence, the marvelous workmanship of Andrea Pisano, were molded in clay and cast by Venetian masters. They are among the many unsurpassed art treasures in the film, "The Renaissance."*

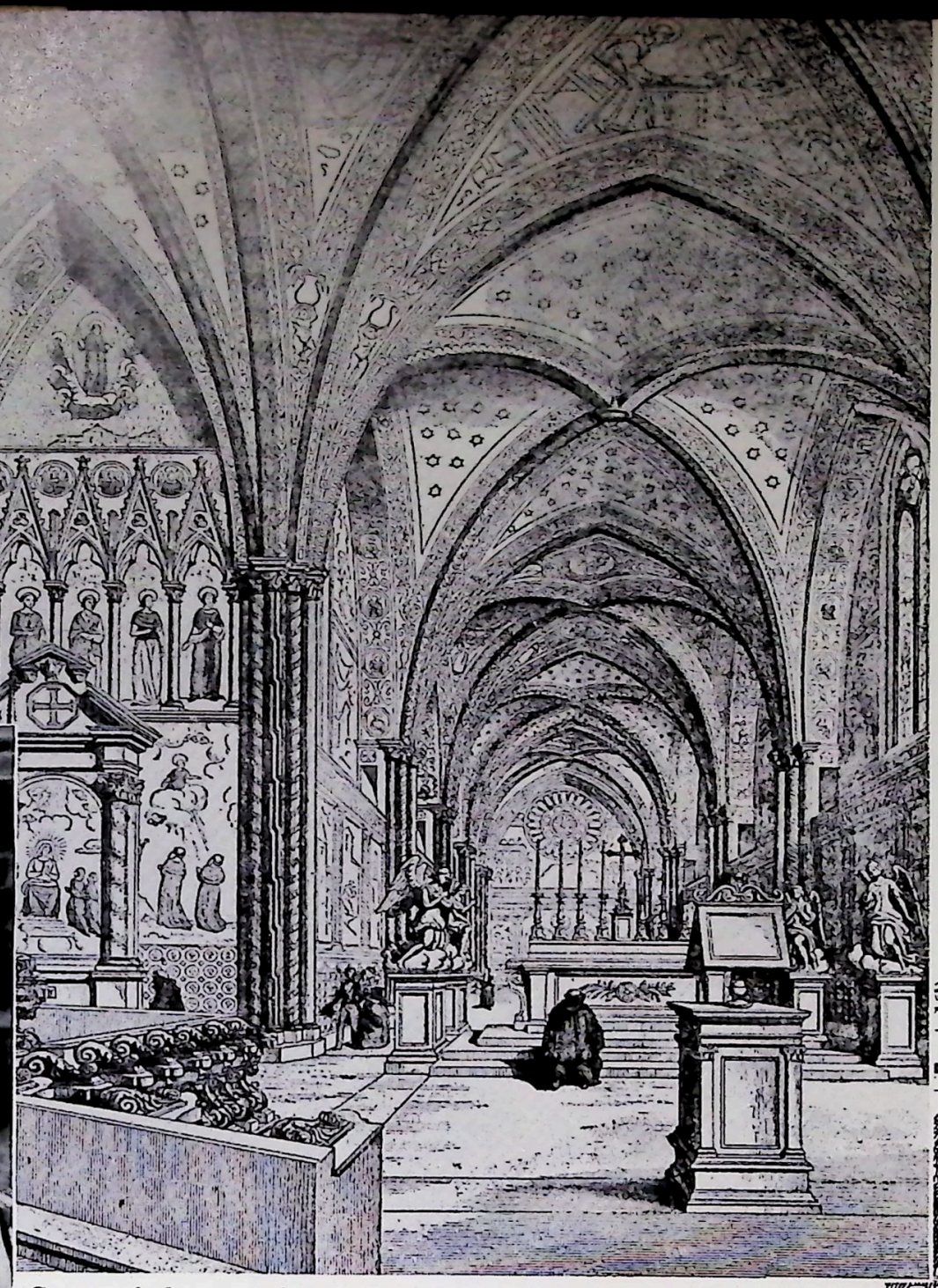




*One of the several intellectual avenues traveled by Renaissance scholars led back to classical philosophy, literature, art and science. A new value was put on the heritage from ancient Rome, including such examples as the well-preserved Arch of Constantine.*

*Attributes of Roman civilization, which spread over much of Europe and the Near East before dying of its own decadence, were revived during the Renaissance to become a basis for much of modern science, philosophy, literature, art and architecture.*

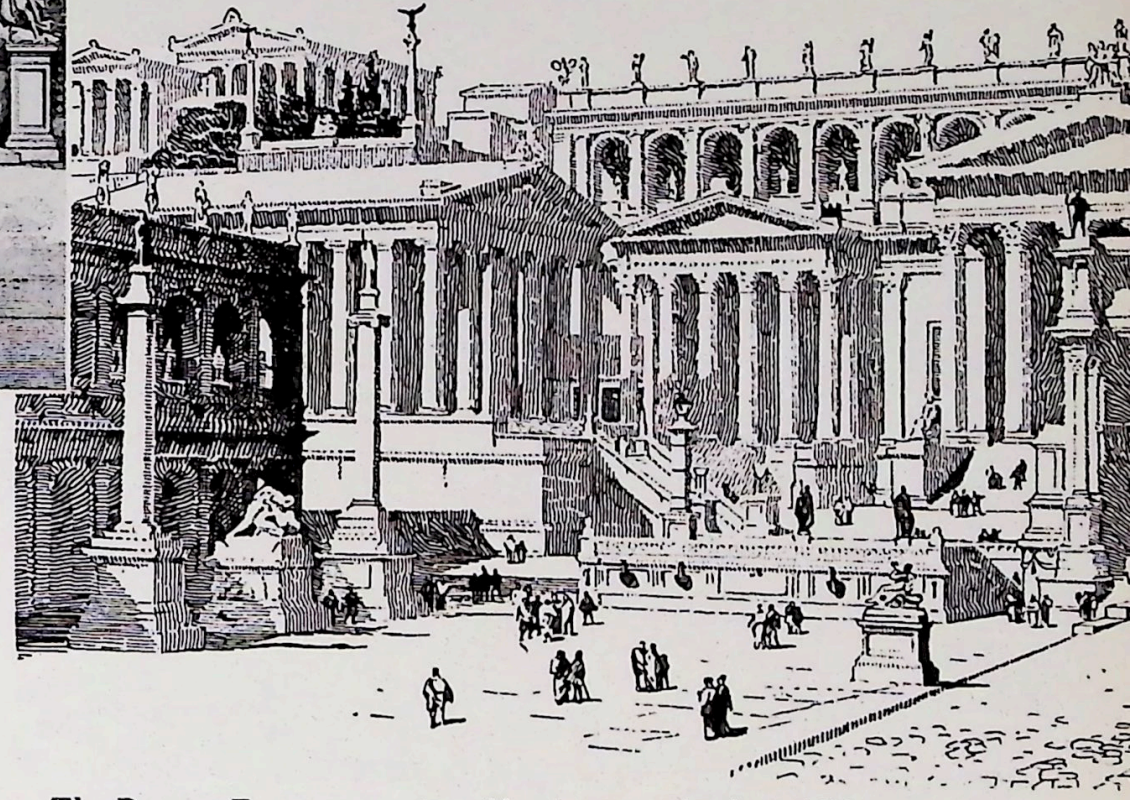
*A replica of Michelangelo's statue of David may be seen in La Loggia dell' Orcagna in Florence.*



*Some of the mural painting of the Upper Church of St. Francis at Assisi, Italy, is attributed to Giotto. In the Lower Church, 4 singularly beautiful allegorical works in honor of St. Francis, scarcely dimmed by time, are undisputably his.*

*Examples of Renaissance art have found their way into many museums and private collections in the United States. These figures appear on a well-curb cut from a single block of marble which ornamented an old palazzo near Milan, Italy, before being brought to this country.*

*The Medici monument ranks among the finest of Michelangelo's sculptural works. The portrait-statue of Lorenzo de' Medici and the symbolic figure of Dawn are part of 3 groupings of figures in the sculptural ornamentation of the Medici Chapel.*



*The Roman Forum, a center of business and cultural life, was surrounded by porticos, basilicas, law courts and other public buildings. Its highly advanced culture, lost in the Middle Ages, was recaptured by Renaissance scholars.*

*The story of art is the story of life—of men expressing the turmoil and aspirations of their time and speaking to posterity in their contemporary language. Approximately 400 National Gallery art works have been transferred to Encyclopaedia Britannica filmstrips in original color.*

*"The Last Supper" by Venetian artist Sebastiano Ricci is representative of the master paintings included in the 5 donated private art collections which form the nucleus of the National Gallery—masterpieces which rival the older, better known European collections.*

*In the Gallery collection of over 1000 paintings is "The Rest on the Flight into Egypt" by Flemish artist Gerard David. Paintings, sculpture, drawings and other art masterpieces are all carefully lighted and arranged to be seen on the screen to best advantage.*

# FILMSTRIP

# NATIONAL GALLERY

THE rich collection of paintings and sculptures of the National Gallery of Art in Washington, D.C. has been transferred to filmstrips in full original color by Encyclopaedia Britannica Films, to bring some of the world's greatest masterpieces into the classroom. The filmstrips tell a carefully integrated story of art from the Renaissance to the present century.

The *National Gallery of Art* series includes ten filmstrips of approximately sixty frames each: *Art in Early Renaissance Italy, Art of the Northern Italian Renaissance, Art of the High Renaissance, Art of the Northern Renaissance, Art of the Low Countries, Art of Spain, Art of Royal France, Art of England, Art in the United States,* and *Art in 19th Century France.*

The National Gallery is also the subject of a thirty minute motion picture in color entitled *Art in the Western World,* which starts with the thirteenth century and highlights the development of western art. The most important schools of art and cross currents are represented, including the development of art in the United States.

Encyclopaedia Britannica filmstrip and motion pictures can be profitably used in conjunction with each other: the filmstrips, with their text material, can be studied and discussed, followed by the motion picture, which will then have more meaning and give additional views of the paintings—or the motion picture may be considered the primary teaching material and the filmstrips used for review purposes.

The motion picture on art—and there are several in addition to *Art in the Western World*—has the advantage of being able to give the illusion of actually taking the class into the gallery and permits a more thorough examination of the paintings. The filmstrips, on the other hand, may be held on the screen as long as necessary and can easily be turned back to review pictures already seen. A complete filmstrip library may be acquired inexpensively by a small school or school system and requires little storage space for either projection equipment or filmstrips, over two hundred of which may be stored in one cubic foot of space. The equipment is easily operated, lightweight to carry and sturdy enough to withstand many years of extensive classroom usage.

Other Encyclopaedia Britannica art filmstrips include *Art in Our Classroom, Artists of Holland, Classroom Art for Middle Grades, Arts and Crafts* and *Contemporary Painting.* There are also approximately three dozen motion pictures on art subjects concerned with a variety of art techniques, mediums, artists and crafts. ♦

*"The Annunciation" inititated the northern style of Renaissance painting. With the recently perfected technique of painting in oils, Jan van Eyck was able to convey hitherto unobtainable realism.*

*"St. John the Evangelist on Patmos" by Titian is representative of the Venetian school of painting. Noted as the Renaissance exponent of glorious, vibrant color, Titian lived to the age of 99, three times the normal lifetime of that plague-ridden era.*

*El Greco, the mo*
*ish school who pa*
*was a Greek. The*
*two outer figures*
*added by a forme*
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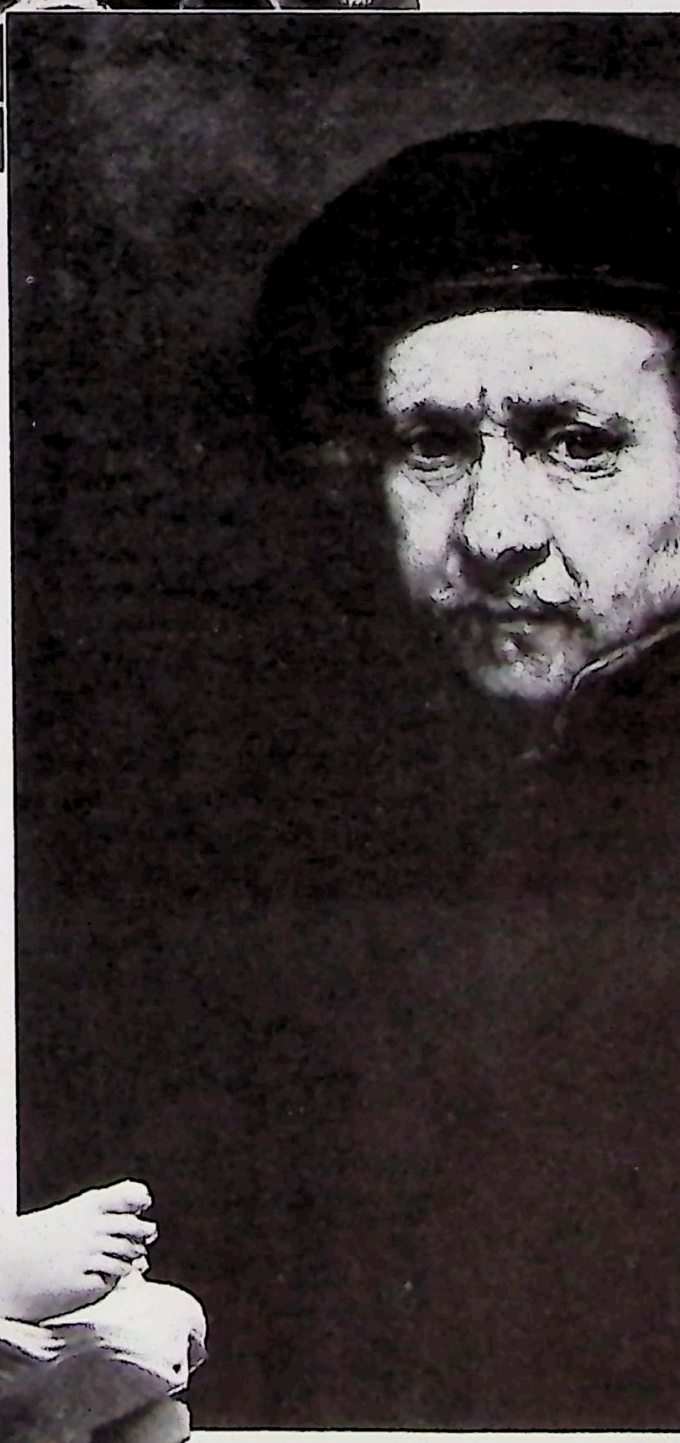
*to the National*

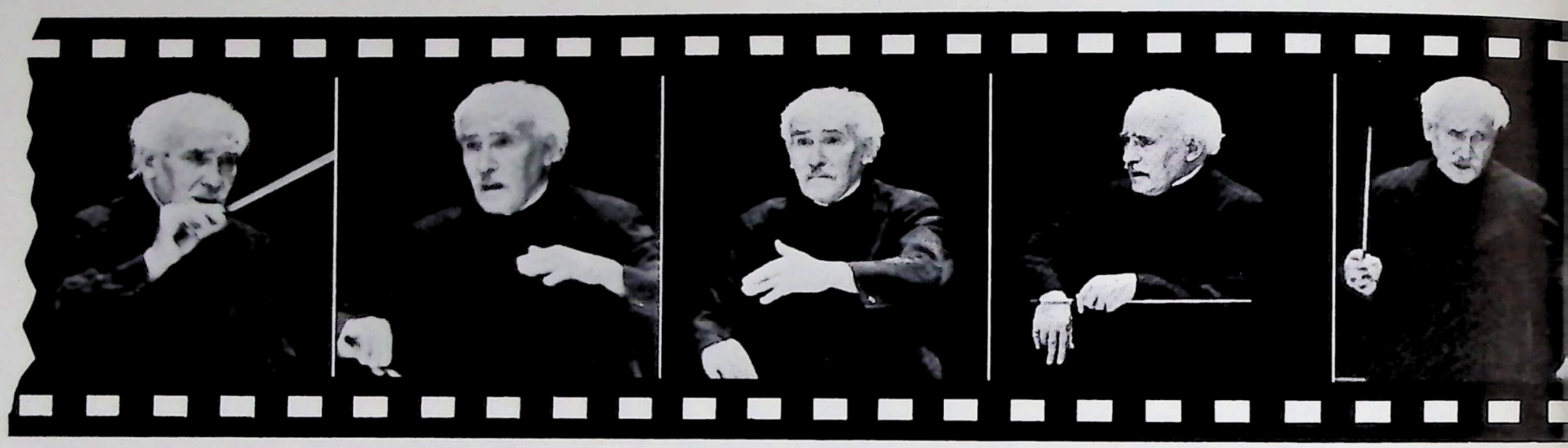
*Sculpture halls lead to garden courts from the central rotunda of the classical rose-white marble gallery. Among the museum's sculptural works is "Madame de Pompadour as the Venus of the Doves" by French sculptor Etienne-Maurice Falconet.*

of ART



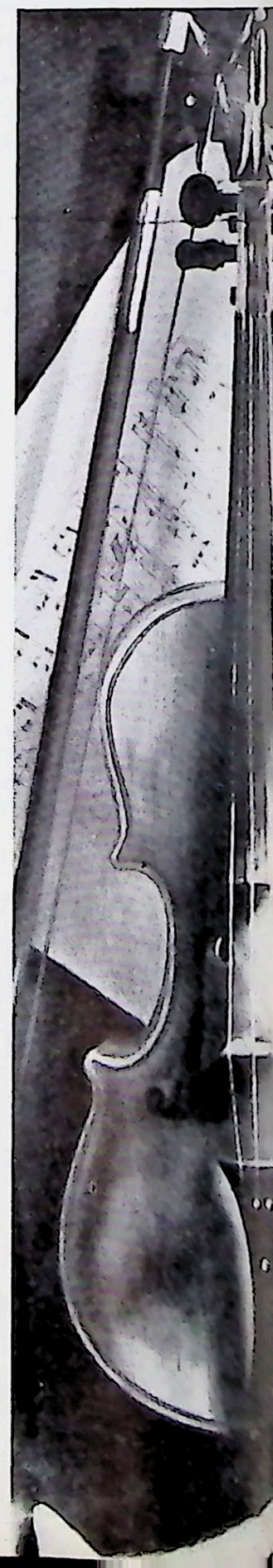
*In more than 60 self-portra*
*through his last year of life, R*
*his autobiography. He first app*
*young cavalier; then as a pr*
*aged burgher; and last as a*

# listening to GOOD MUSIC



*Conductors have become stars whose names outshine the names of the orchestras they conduct. This is a relatively modern development, particularly brought on by the popularity of phonograph records and through the mass media of radio and television. The name of the late Arturo Toscanini became a household word and was billed on programs as the main attraction of symphonic concerts. Because of their musical domination of the orchestra, conductors have often been the moving spirit in the development of an orchestral organization.*

*School bands and orchestras profit from studying the gifted musicians who demonstrate instrumental techniques in various musical films produced by Encyclopaedia Britannica Films. They also gain a better concept of the structure of composition and acquire fascinating historical background information in the musical field which adds to their growth, knowledge and understanding as musicians.*



*Different combinations of instruments can be used to change the tonal qualities or mood of a composition. The Encyclopaedia Britannica cameraman filmed a string quartet, enriched by the addition of a clarinet, to illustrate the evolution of the symphony—through the addition of more strings and the introduction of woodwinds, brasses and percussion instruments.*

*An entire symphony orchestra is brought into the classroom on several of the Encyclopaedia Britannica musical films, which not only gives the class an opportunity to enjoy the performance of great classical compositions, but also provides illustrations of techniques and demonstrates the instrumental elements comprising compositions and the way they augment, complement and enhance one another.*

THE development of music, its instruments and components, is excitingly portrayed in excellent sound films produced by Encyclopaedia Britannica Films. Close-ups of instruments as they are individually played and a demonstration of their place in musical composition brings students a more rewarding understanding, enhancing their enjoyment of good music.

One of the oldest ways through which man creates music is by singing, always a basic means of self-expression. The film, *Vocal Music*, demonstrates that the human voice is a remarkable instrument, which—elevated to an art form—provides stirring experiences.

The Fine Arts Quartet illustrates the basic musical nature and playing techniques of the string quartet, through the use of its own carefully matched set of old Italian stringed masterpieces in two films, *Listening to Good Music* and *Playing Good Music.* These techniques include bowing and fingering, methods of double-stopping and playing chords on the violin, finger rocking to produce vibrato and the skills involved in playing loudly and softly. Although there are other musical foursomes, such as woodwind, brass or vocal quartets, the string quartet has been the most popular since the eighteenth century, when the composer Haydn first explored its possibilities.

These films also demonstrate tonal quality, or timbre, and how the composer uses the voices of the quartet to create moods and develop a theme, which is introduced by the first violin, picked up by the second violin and viola, and finally taken over by the cello, so that the theme, like a ball, is tossed from one player to another. While most instrumental and choral groups have a conductor, the leadership in a quartet passes from one player to another and cues are taken from the one playing the lead.

The Encyclopaedia Britannica Films' Symphony Orchestra Series: *The String Choir, The Woodwind Choir, The Brass Choir, The Percussion Group* and *The Symphony Orchestra,* were recorded and photographed in the musically famous city of Vienna, Austria. The orchestra in the films is the Vienna Symphony, conducted by Professor Hans Swarowsky, who teaches an international class of musicians in Vienna. It was in Vienna that Joseph Haydn, the father of the symphony, worked most of his life and that Mozart, Beethoven, Schubert, Brahms, Mahler and other classical composers created their masterpieces.

The symphony conductor is said to be a musician who plays music by using the entire orchestra as his instrument. Orchestral music, which originated in the string quintet, expanded from only five single voices to become a whole string orchestra of five sections. Composers looking for more volume and range found it in different colors of sound—in the flute, trumpet and oboe—which enriched the stringed voices. Wind instruments, from their role as soloists, became an integral part of the orchestra, more volume and brilliance were added with brasses borrowed from military bands and finally percussion instruments joined to complete the present day symphony. With this variety in range, tone, volume and color, the modern symphony orchestra became the most versatile musical body.

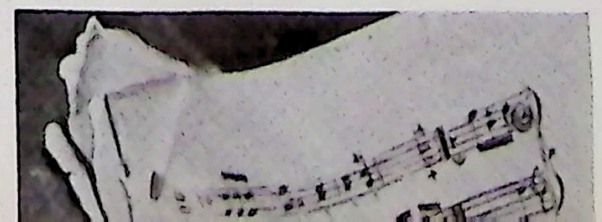
Within the orchestra, the most versatile instrument is the violin and, to some degree, as *The String Choir* brings out, the viola, cello and the bass viol, often called the contrabass, exhibit the violin's quality of rich tonal adaptation and expression. The string choir serves primarily as foundation tone for the entire orchestra.

Woodwind instruments are among the oldest and their versatility has been increased through the years to a range that covers the entire scale. *The Woodwind Choir* introduces the flute and piccolo, lyrical oboe, English horn, clarinet, bass clarinet, the bassoon and contra bassoon. The compositional use of woodwind instruments is revealed in pieces pointing up the tonal color achieved by playing the strings against the woodwinds and the new and stirring quality given modern orchestral architecture by the interplay of strings, woodwinds and horns.

Brass concertos, taking advantage of the contrasting tone, timbre and range of brass instruments to achieve majestic harmonies, were introduced during the Renaissance, according to the film, *The Brass Choir.* The modern trumpet evolved from the long, straight instrument used in religious ceremonies and in battle and the herald trumpet, an instrument of nobility, used only in the service of barons and kings. The long tubes of the brass horns of the hunting field were unwieldy when played by a rider, so the tube was bent to fit over the arm of the player and the French horn resulted. With the development of valves after 1815, trumpets and French horns became art instruments, each with a wide range of tones.

Long before there was music, there was dance and the drum is probably the oldest dance instrument. Evolved from a primitive rhythm instrument to the military or marching instrument of the late Middle Ages, the drum and other percussion instruments found their way into symphonic orchestras of the early nineteenth century. Everything that can be struck or beaten can be considered a percussion instrument.

The Children's Concert Series consists of four films—*Rhythm and Percussion, Woodwinds and Brass,* and *String Instruments,* which are all one reel films, and *Children's Concert,* which is four reels and combines the material of the other three. These films teach the fundamentals of each instrumental group in simplified fashion for children in primary grades. All Encyclopaedia Britannica music films provide a basis for continued and enhanced appreciation of music. ♦



*Conductor Eugene Kash explains the score of "Hansel and Gretel" to members of his audience after one of his children's concerts. Mr. Kash also serves as conductor and narrator for the Encyclopaedia Britannica Children's Concert Series, in which he demonstrates that every living thing grows and moves in rhythm, shows how variation in the length of the air column in woodwind instruments produces different tones, illustrates the meaning of the word "shape" or "form" and makes other musical concepts exciting yet simple, so youngsters can grasp them.*

*The Encyclopaedia Britannica film, "Conducting Good Music" shows how, with the growth of the orchestra, the need for a leader arose. The harpsichord player provided guidance in the small instrumental ensembles of the 17th and early 18th centuries. Then the first violinist took over until the specialist-conductor emerged. Following the composer's indications in the score, the conductor designates rhythm and speed, creates accents or commands silence by means of musical sign language. He can establish varying moods with a score by emphasizing different instrumental groups or changing the tempo. Some great composers of symphonic music, such as Mahler, Richard Strauss, Mendelssohn and Berlioz, were also noted conductors.*

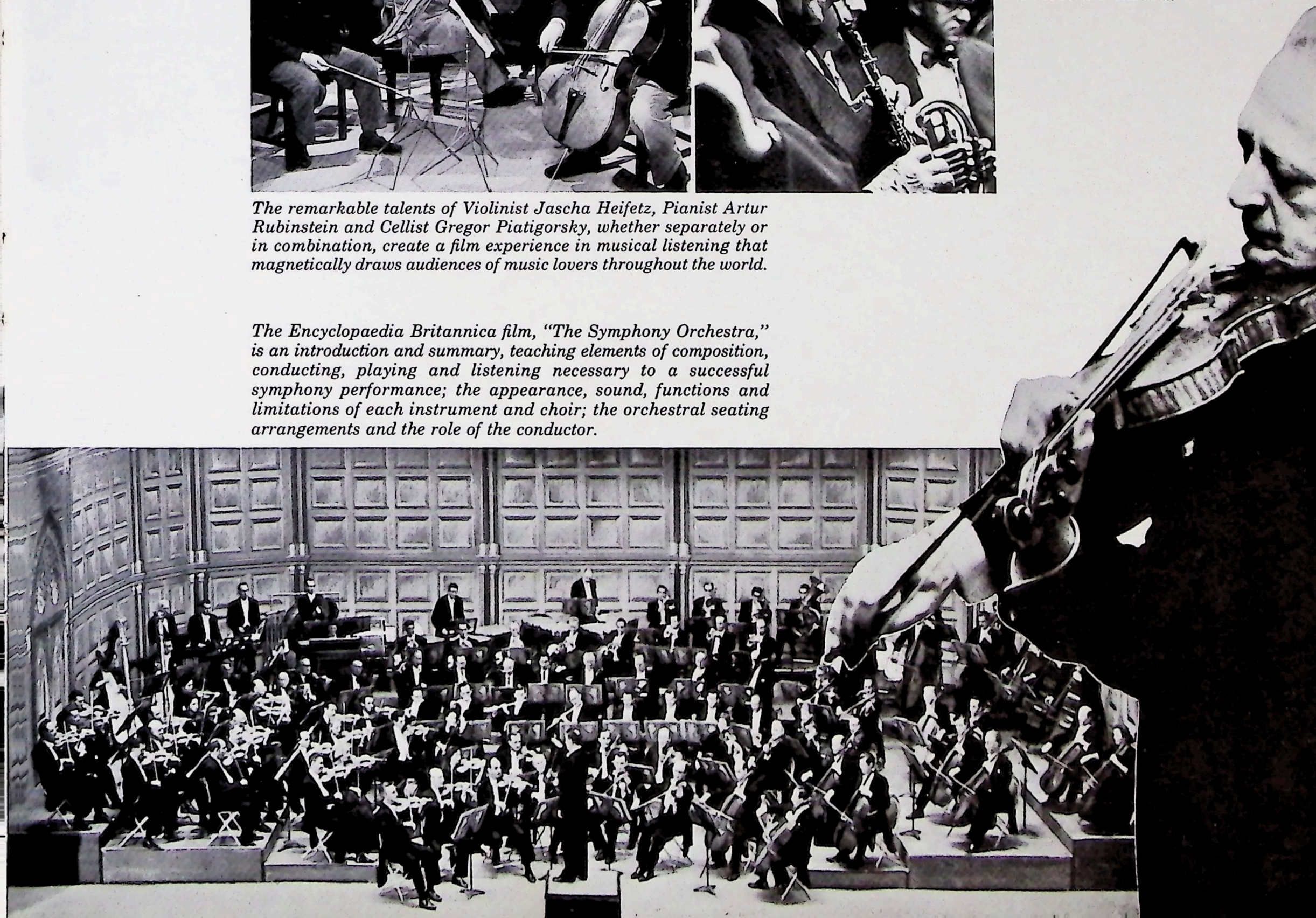
*The trombone, which is introduced in the Encyclopaedia Britannica film, "The Brass Choir," is generally characterized by sliding tubes, although there are also valve trombones. The quality of tone varies greatly in different instruments and registers—the tenor and bass having a rich full timbre, while the sound produced by the alto trombone is hard. Of all wind instruments, it has perhaps been the least modified in form—changes have occasionally been attempted, usually with little success.*

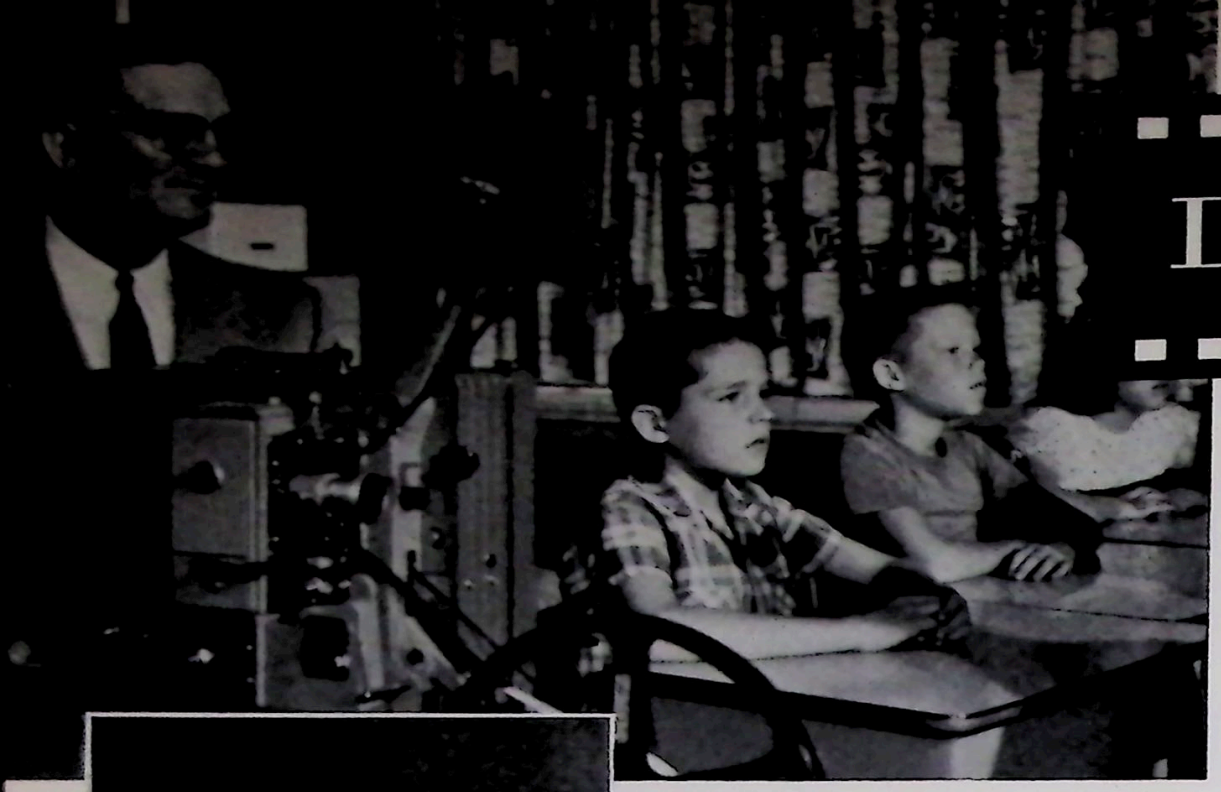
*Group singing, first in unison and later in parts, originated in western religious worship and the early growth of choral music in the United States, as elsewhere, was associated with the church. The Puritans of New England, despite the aversion toward musical culture that they brought with them, were mainly responsible for the earliest developments. Over a century of controversy was required, however, before churches in America reluctantly accepted organized singing from printed music rather than from memory. The first musical organization of amateur singers in the United States formed in 1786. Choral singing has since become a popular school and community activity.*

*The remarkable talents of Violinist Jascha Heifetz, Pianist Artur Rubinstein and Cellist Gregor Piatigorsky, whether separately or in combination, create a film experience in musical listening that magnetically draws audiences of music lovers throughout the world.*

*The treble member of the woodwind choir, the oboe or hautboy, probably originated during the Middle Ages. The most perfect and delicate of reed instruments, it is one of the most valuable and indispensable members of the modern orchestra.*

*The Encyclopaedia Britannica film, "The Symphony Orchestra," is an introduction and summary, teaching elements of composition, conducting, playing and listening necessary to a successful symphony performance; the appearance, sound, functions and limitations of each instrument and choir; the orchestral seating arrangements and the role of the conductor.*





# LITERATURE...

THE beginnings of a truly American literature and its early growth are vividly experienced in the Encyclopaedia Britannica films tracing the lives of authors of American classics. Each film recreates an eminent literary personage as a living individual with a distinct character and personality.

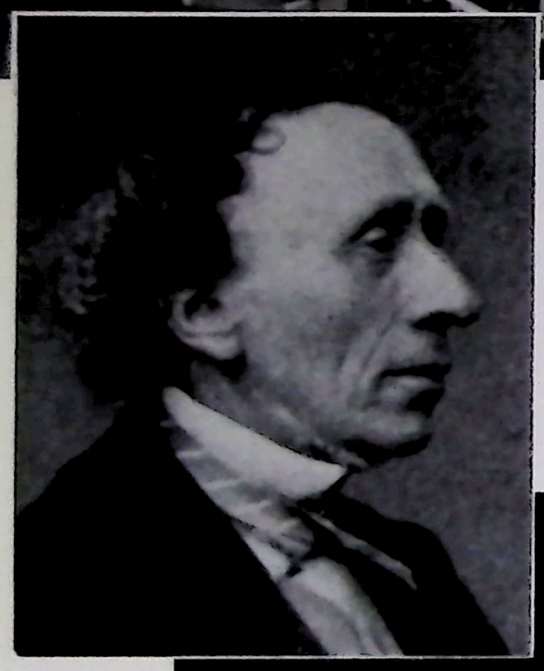
The part these pioneers in the establishment of a purely American literature played in shaping the events of their time—and the part the events of their time played in shaping their writings—give a special interest to these excellent films. These motion pictures bring an understanding of the environment, family background and incidents that inspired certain works, making the study of the writings more meaningful.

This is very plainly seen in the film, *Louisa May Alcott,* as the camera records the joys and heartaches in her New England girlhood that were fictionalized so successfully in her unforgettable *Little Women.* Thus, the film helps teachers to get across how excellently Louisa May Alcott's writings have captured the family life of her time with such completely genuine and universal characters that, although they are clearly of their period, are timeless and beloved by each new generation.

In the same way, James Fenimore Cooper has immortalized the American pioneering days, Whittier's poetry holds the essence of nineteenth century life in the New England countryside and Washington Irving imprinted eighteenth century New York between book covers. Students seeing this dramatically presented on the screen prior to studying the works of the authors, gain far more enjoyment, understanding and appreciation of what they read and remember it longer.

Attitudes and events of times past are more believable when seen than when read. Long descriptive passages of furnishings and clothes long outmoded are sometimes tedious reading to the mind that has nothing to relate them to; when students have seen such attitudes, events, furnishings and clothes in their proper context on the screen, reading these passages is no longer a matter of just reading words, but a recreating and relating of satisfying mind pictures.

Other Encyclopaedia Britannica films, *A Charles Dickens Christmas, Chaucer's England* and *William Shakespeare,* enable teachers to set the mood for study of English literature. Since these writings are set in a time even more remote and distant from most students than the works of American writers, the colorful, effective films are essential for a real comprehension of the works of these great English writers. ♦



*Literature films produced by Encyclopaedia Britannica for primary pupils include a charming adaptation of Hans Christian Andersen's "The Ugly Duckling," as well as a variety of other classic childhood favorites among the fables and fairy tales.*

*Aesop is represented among primary grades films with "The Fox and the Rooster," "The Golden Axe," "Hare and the Tortoise," and "Three Fox Fables."*

*The beloved story, "Little Women," is based on Louisa May Alcott's girlhood.*

*In filming "Louisa May Alcott," episodes were carefully selected to show not only what she wrote, but how her character and environment affected her work; not only her literary importance to her time, but her continuing place in literature.*

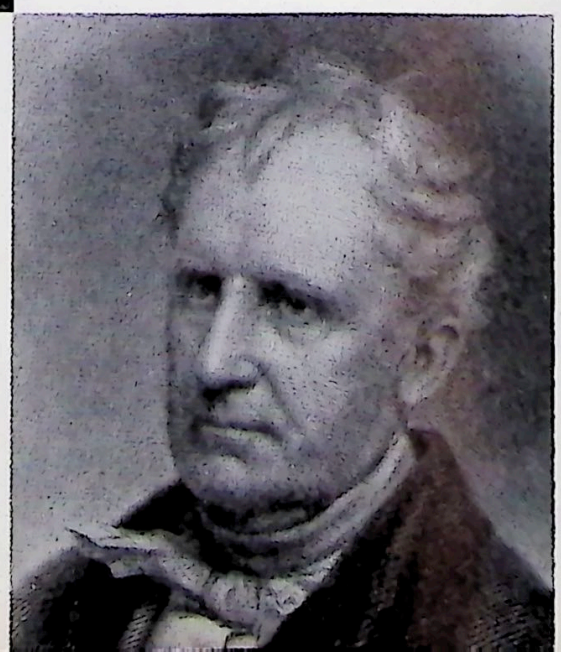
L. M. Alcott.

LOUISA MAY ALCOTT

has arrived, is more probably the case.
me know how the fact is
Yours truly
J. Fenimore Cooper

JAMES FENIMORE COOPER

*The youngest of 8 children, Cooper evidenced a youthful fascination with pioneer life which emerged in the first great novels based on the American frontier scene.*



Oliver Wendell Holmes

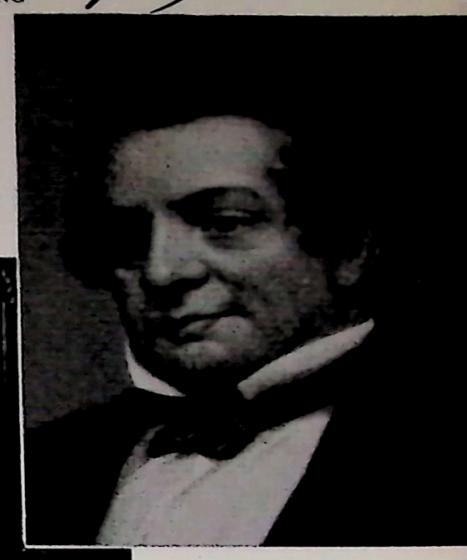
OLIVER WENDELL HOLMES

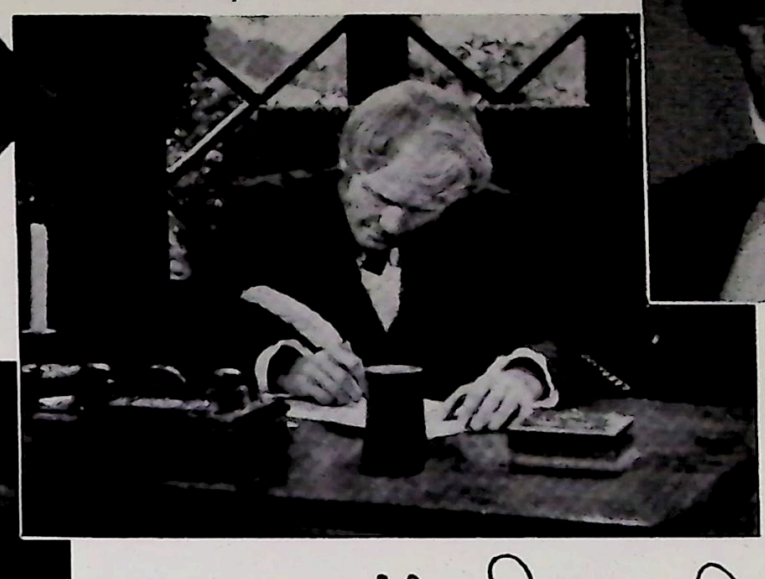
*Throughout his distinguished career as a doctor and an author, Oliver Wendell Holmes took part in the most important battle of the 19th century—the battle to free the minds of men from superstition and prejudice.*

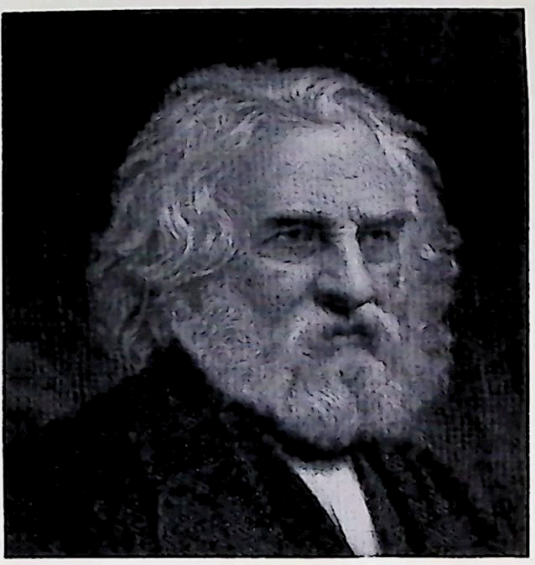
Washington Irving

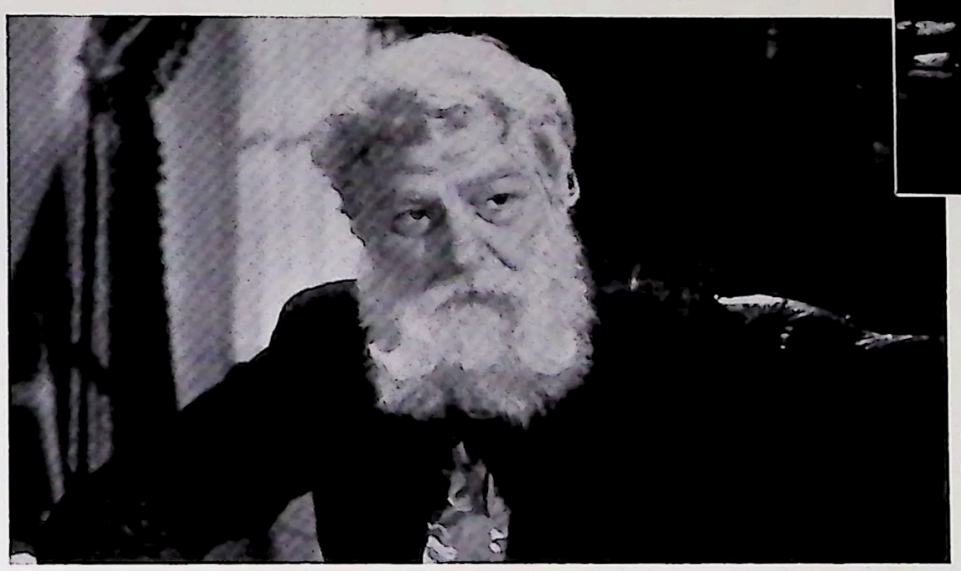
WASHINGTON IRVING

*Among Washington Irving's earliest literary efforts were lively satirical newspaper contributions on New York theatre and society, "The Letters of Jonathan Oldstyle, Gentleman." He is best known for his "Sketch Book."*





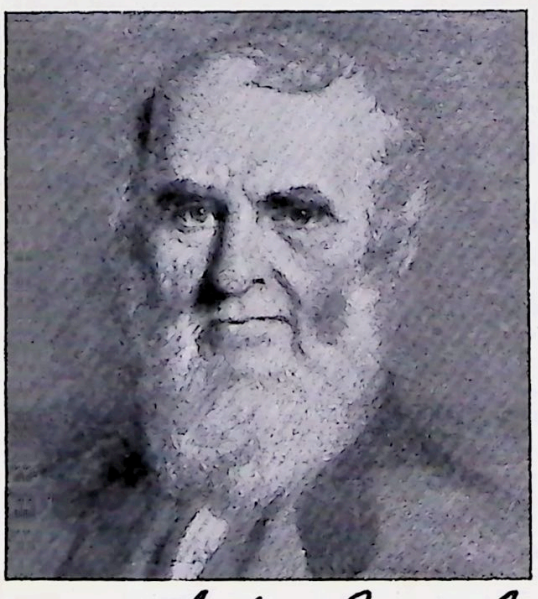




Henry W. Longfellow

HENRY WADSWORTH LONGFELLOW

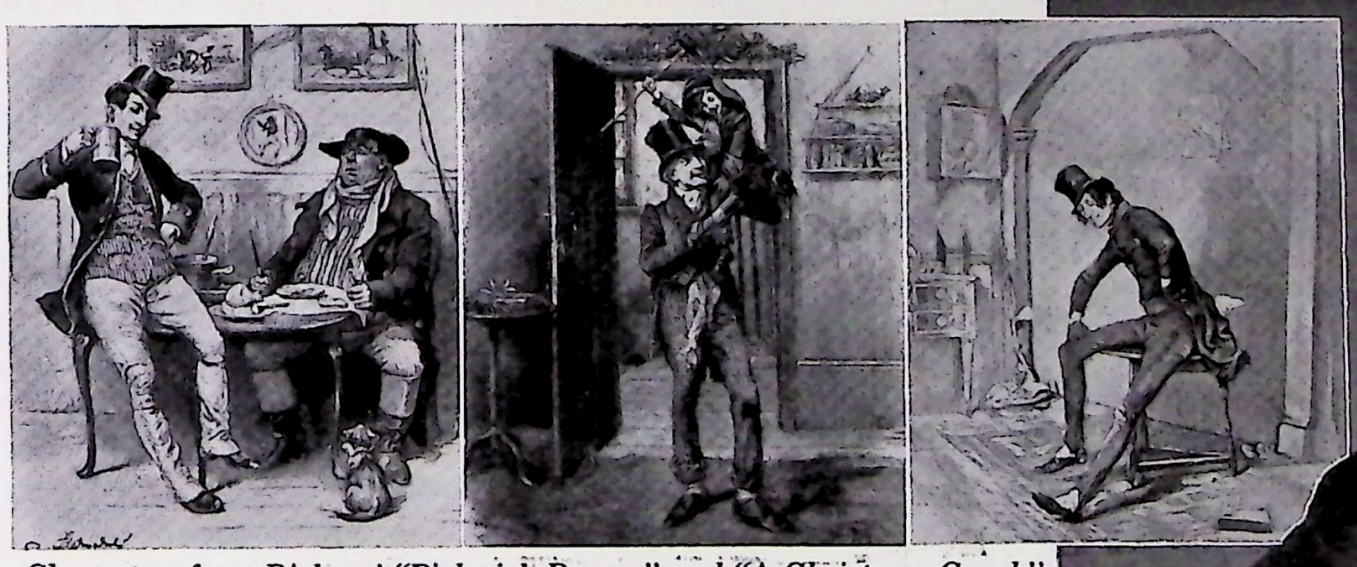
*While Henry Wadsworth Longfellow was still in college, his poetry was being published. Following further study in Europe, he became a famous poet.*



John G. Whittier

JOHN GREENLEAF WHITTIER

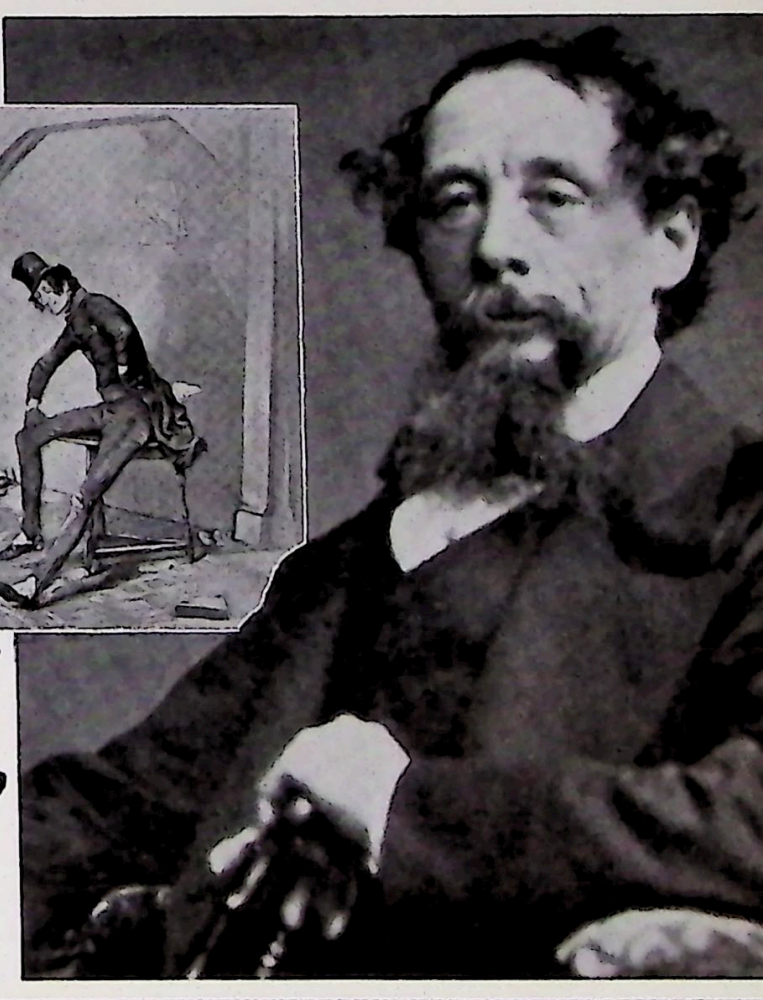
*A distinctly American poet, John Greenleaf Whittier preserved for posterity everlasting pictures of the New England countryside.*

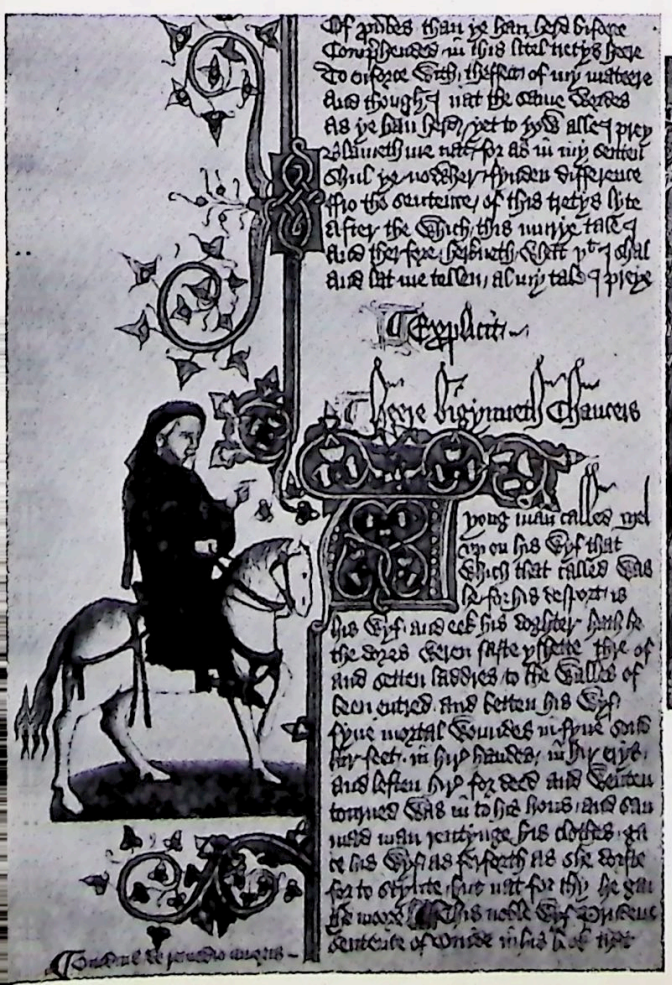


*Characters from Dickens' "Pickwick Papers" and "A Christmas Carol."*

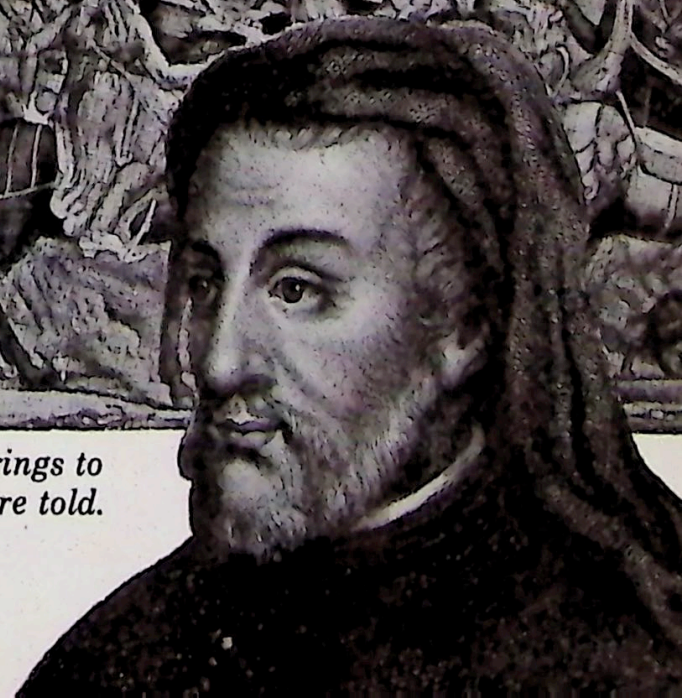
Faithfully Yours Charles Dickens

CHARLES DICKENS





*The Encyclopaedia Britannica film, "Chaucer's England," brings to life the conditions under which his "Tales of Canterbury" were told.*



# the HUMANITIES

## GREAT DRAMATIC LITERATURE

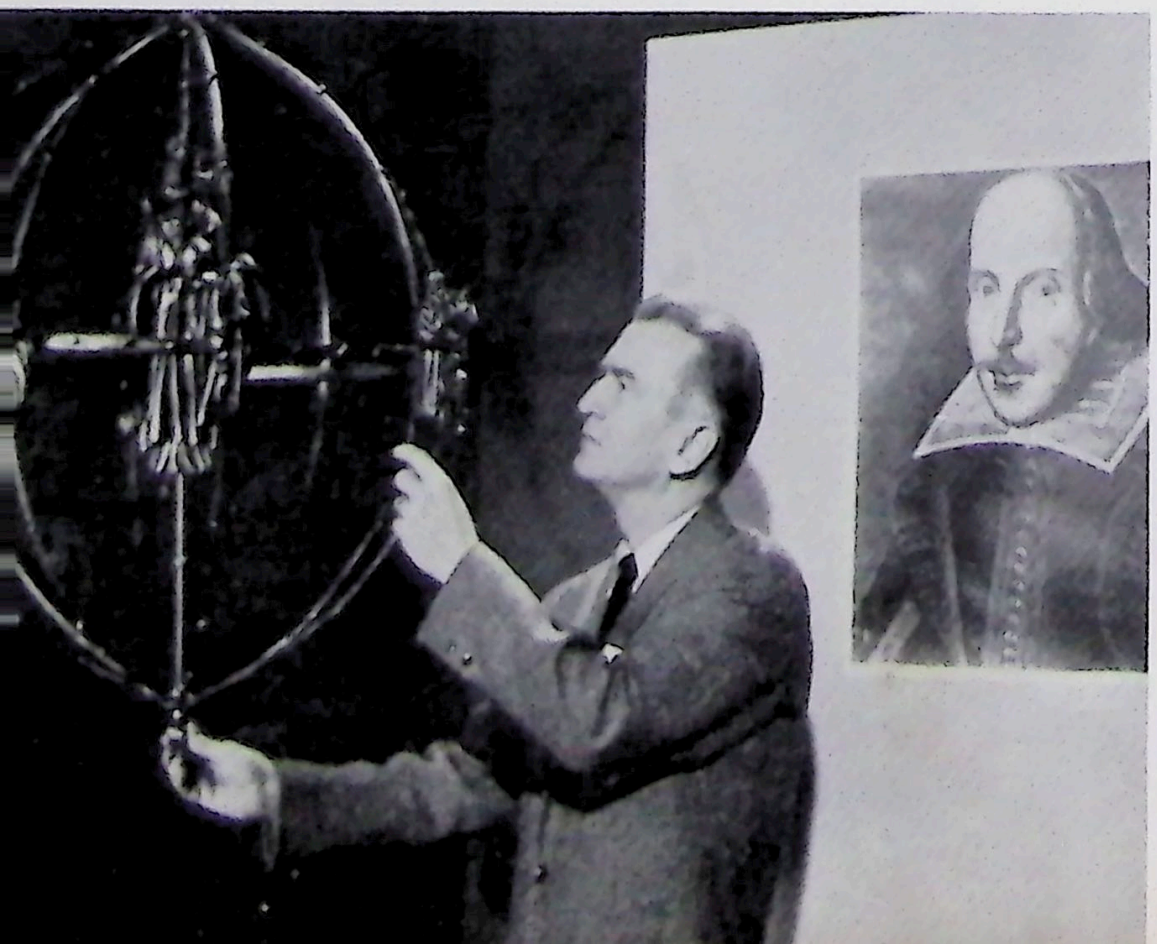
ENCYCLOPAEDIA Britannica Films' Humanities Series, a dozen films teaching the theatre, *Hamlet* and *Oedipus the King,* have had an overwhelming reception by educators for their masterful, dramatic portrayals. More importance is being given to the study of the humanities as men become more aware of the need of humanistic scholarship in a world in which complex problems cannot be solved by techniques alone. The humanities liberate from the restraints of prevailing ideas and moods; they put beliefs and experiences to continuous questioning, so that life may be examined.

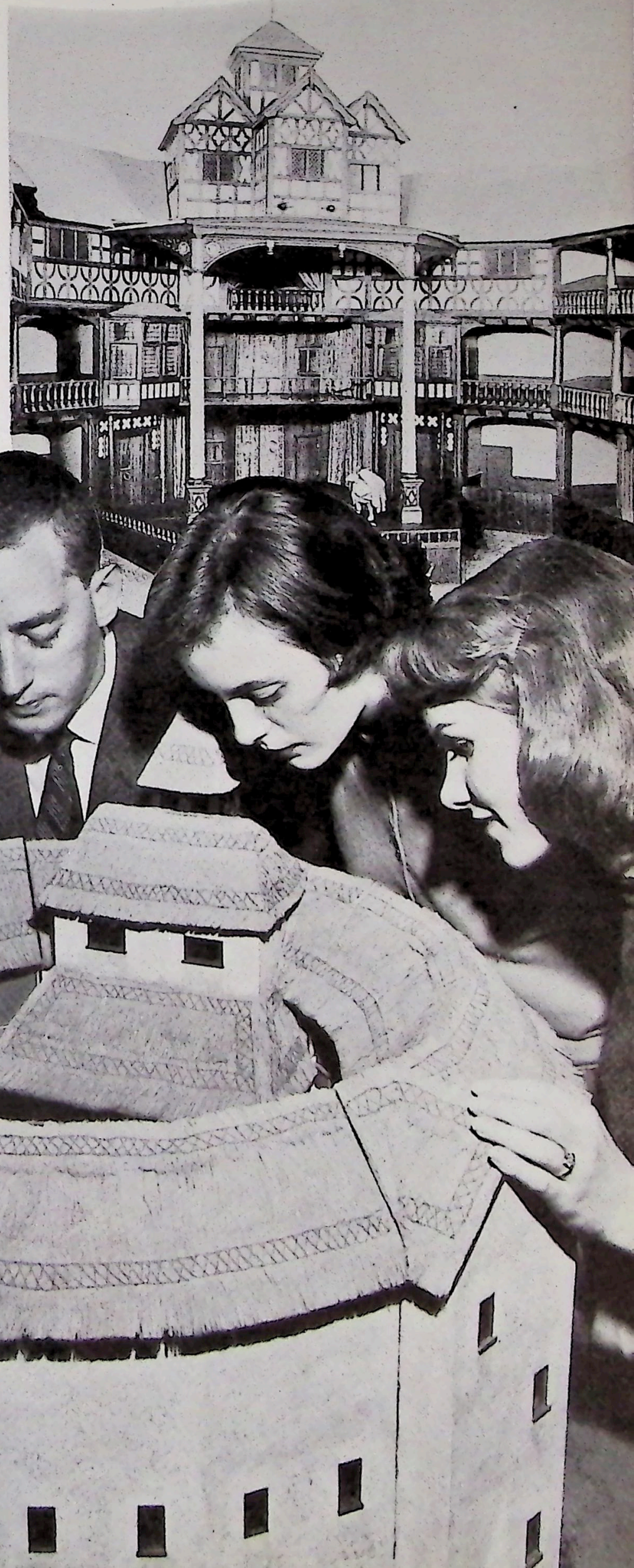
In *The Humanities: What They Are and What They Do,* Clifton Fadiman discusses the relationship to the humanities of a great basic subdivision—the cultural heritage of the theatre. Other films on the theatre contain excerpts from modern plays, including a detailed analysis of *Our Town.* With consummate skill, warmth and clarity, Mr. Fadiman concentrates on the fresh approach and subtle craftsmanship that have gained Thornton Wilder a distinguished position in the modern theatre.

In the *Hamlet* films, Maynard Mack, Professor of English at Yale University, reveals his unique ability to weave together the twisted skeins of Shakespeare's play pattern into a clear picture of Hamlet as a young man, facing some of the problems of growing up—a universally human

*To clarify the intricate interplay of characters in "Hamlet," Professor Maynard Mack of Yale University uses a sphere with representative figures to show how a king resembles the sun—the king being the center around which his people revolve. Encyclopaedia Britannica Films constantly employs such imaginative props to make learning easier and faster.*

*The Stratford Players, who have appeared before audiences totaling more than half a million people on the stage at Stratford, Ontario, have even larger audiences of English students in high schools throughout the world as a result of their portrayal of scenes for the Encyclopaedia Britannica Humanities Series.*





*For years before the Elizabethans built theatres, traveling players performed in inn yards, or wherever space for them and their audience was available. Even the early theatres like the Globe had no proscenium arch, curtains or scenery.*

image, permitting the student to put himself in Hamlet's place. The first film, *The Age of Elizabeth,* orients the student to the time, audience and stage for which Shakespeare wrote; *What Happens to Hamlet* analyzes the Hamlet story—"a ghost story, a detective story, a revenge story"; *The Poisoned Kingdom* indicates the deeper implications, showing how the infection spreads through Denmark and finally strikes Hamlet; *The Readiness is All* integrates all these factors into an understanding of the whole.

In much the same way, Professor Bernard M. W. Knox, also of Yale University, considers Greek tragedy in *The Age of Sophocles, The Character of Oedipus, Man and God* and *The Recovery of Oedipus.* After viewing this series, an instructor wrote, "Your Oedipus is one of the most impressive things I have ever seen. Certainly it is the best piece of teaching." A Harvard professor commented, "They are certainly the best things I have seen in this line. Sometimes things are educationally good and artistically bad, and others are artistically good and educationally bad, but here is something superlative in both directions."

The humanities have thus been added to the vast number of fields in which Encyclopaedia Britannica has broken the communications barrier between subject matter and student for the teacher, helping to create an enduring interest that will continue to enrich the process of education. ♦

*Students study the scale model of the Globe Theatre employed by Professor Mack in his discussion of Shakespeare's staging in the "Hamlet" films. This understanding of the Globe design clarifies stage directions for students and enables them to visualize the positioning of the action of any Shakespearean drama.*

*The comfortable family home in charming, rural Stratford-upon-Avon was the site of Shakespeare's birth in 1564, just as England was emerging from the Middle Ages.*

*William Shakespeare was the genius of the English stage. For 20 years he was actor, part owner and leading dramatist of England's favorite acting company. His broad comedies and historical dramas were performed not only in public theatres, but at royal palaces before Queen Elizabeth and her brilliant court. Little is known about his family life except that he married Anne Hathaway, who bore him three children, Hamnet and Judith, who were twins, and Susanna.*










*The film, "William Shakespeare," combines the few known facts of his life with a brief representation of 16th century England and excerpts from his works, giving depth to the colorful pictorial study.*

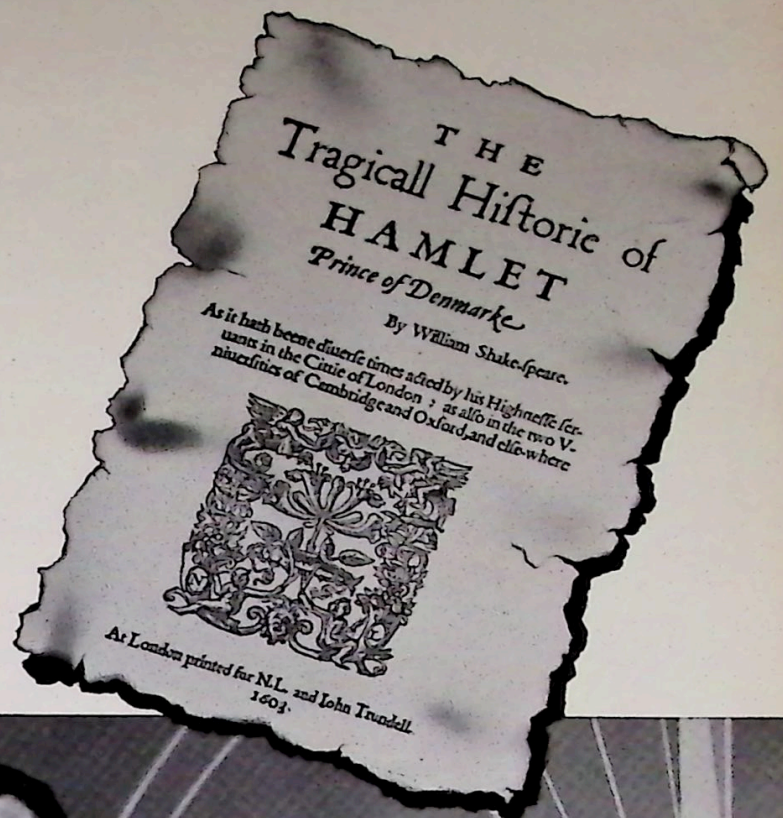
*The name Shakespeare has been variously spelled. Competent paleographers hold that the playwright, in the extant examples of his signature, generally wrote "Shakspere." Of the 5 authentic signatures above, the top one appeared on his mortgage and the lower 3 on 3 different briefs of his will.*

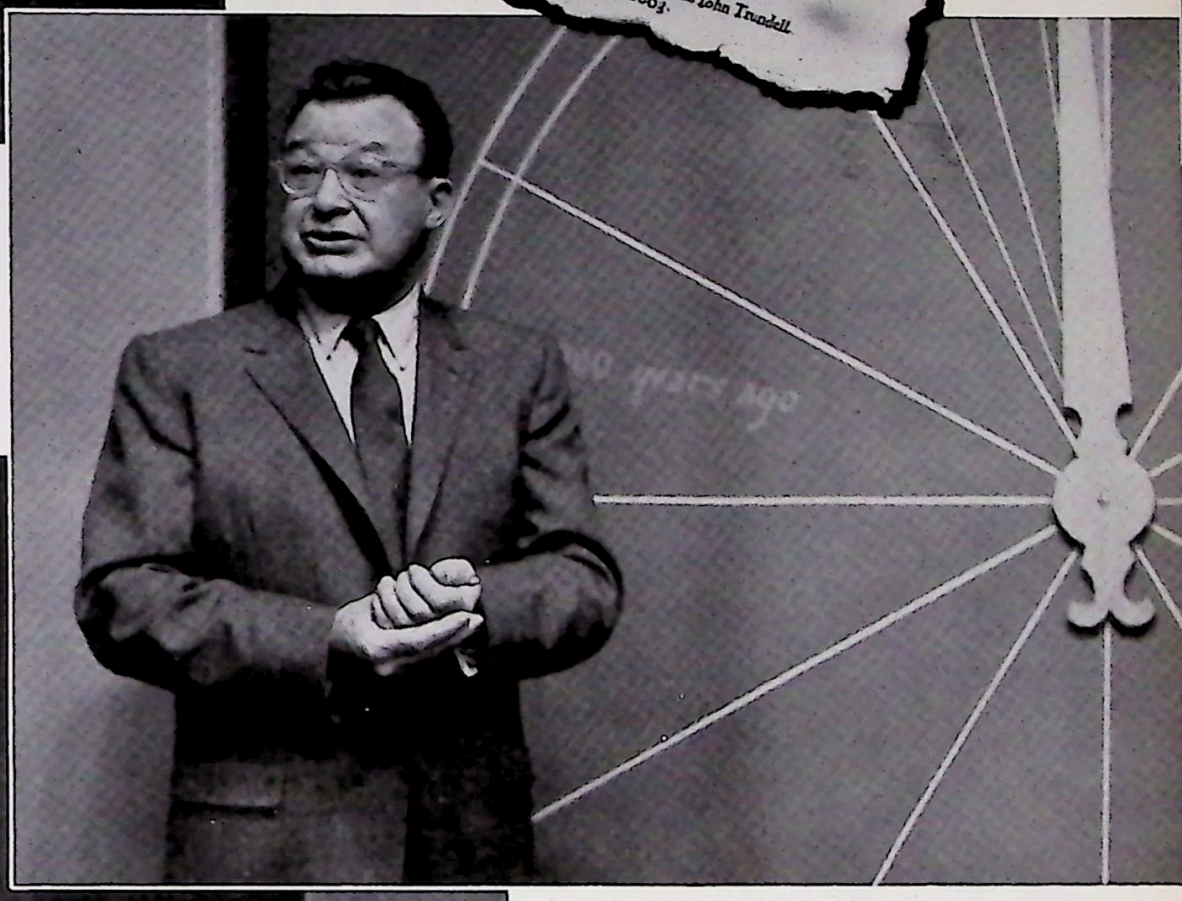


*This 17th century frontispiece is in the Folger Shakespeare Library in Washington, D.C., which also owns 79 First Folios.*

*Although there are no known portraits of Shakespeare painted from life, he is usually depicted as in this painting of him, reciting the tragedy of "Hamlet" to his family. When his only son Hamnet died at 11, he expressed his feelings in a passage he wrote for the play, "King John"—"Grief fills the room up of my absent child, lies in his bed, walks up and down with me, puts on his pretty looks, repeats his words."*

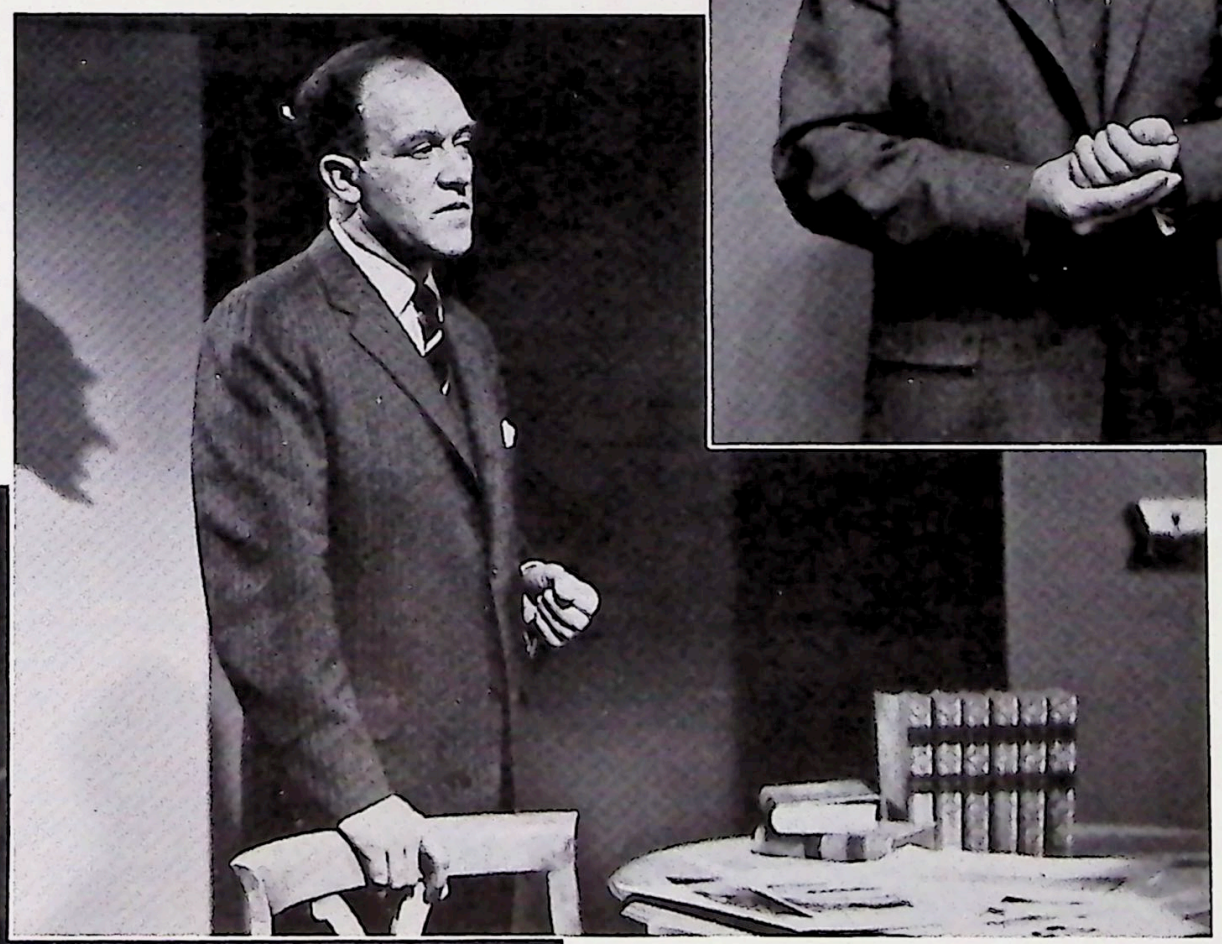
*This title page is from the only extant copy of the First Quarto of "Hamlet."*


THE
Tragicall Hiſtorie of
HAMLET
Prince of Denmarke
By William Shake-ſpeare.
As it hath beene diuerſe times acted by his Highneſſe ſeruants in the Citie of London: as alſo in the two Vniuerſities of Cambridge and Oxford, and elſe-where
At London printed for N.L. and Iohn Trundell.
1603.

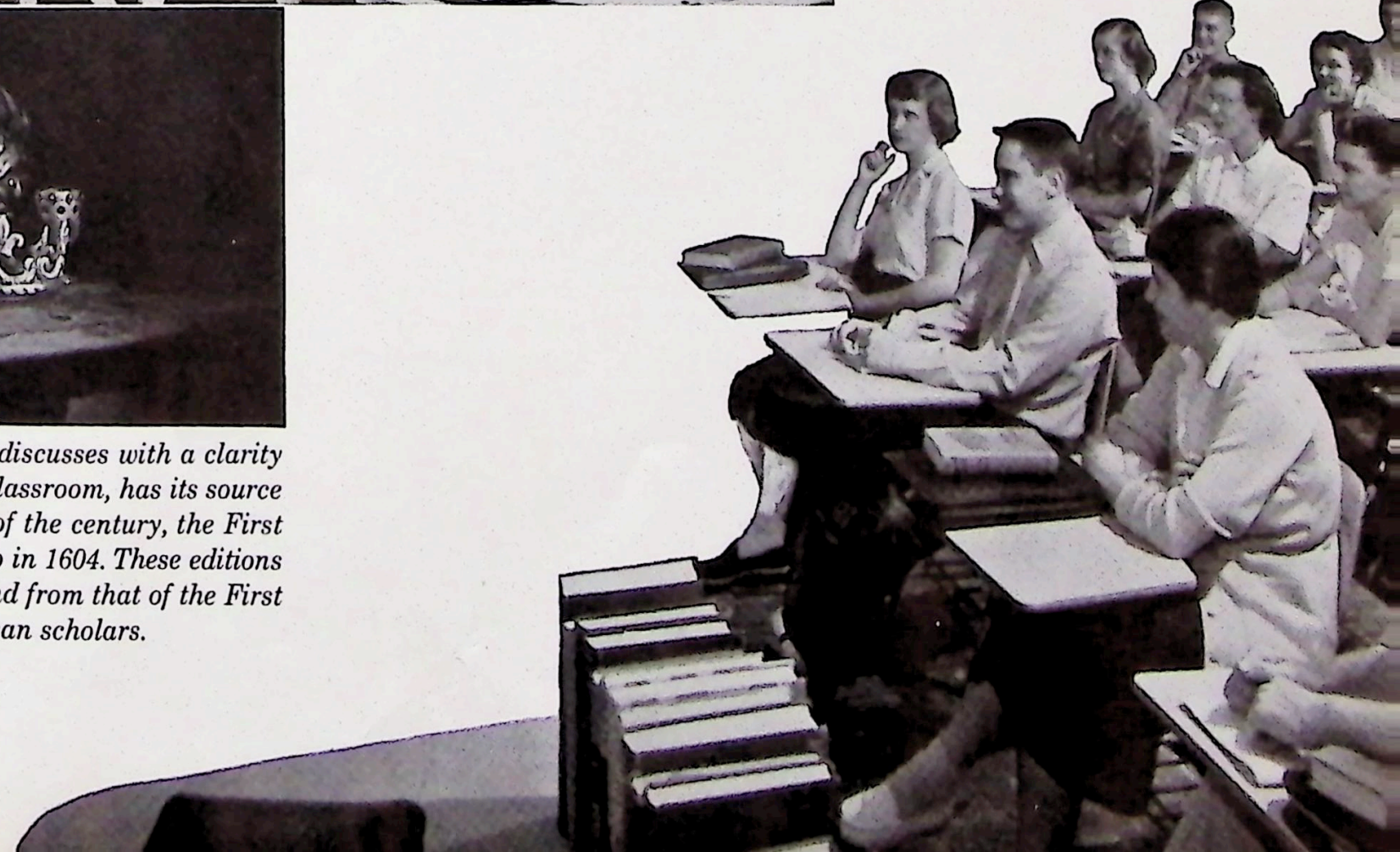


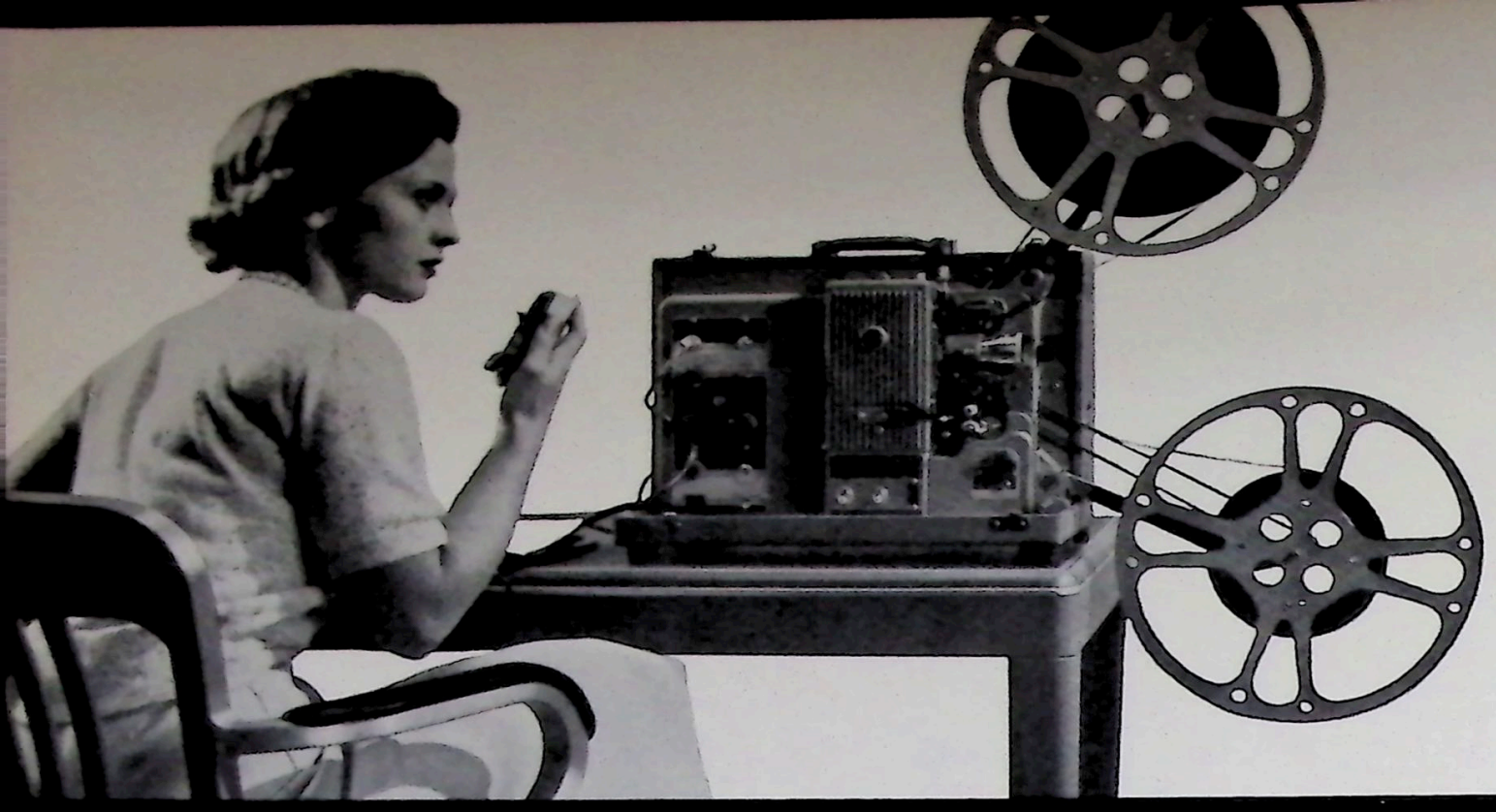
*Clifton Fadiman, noted essayist and distinguished author and commentator of 20th century culture, finds a clock helpful in demonstrating the time that has elapsed since man first appeared on earth for his discussion of the theatre in Encyclopaedia Britannica Films' Humanities Series.*

*After viewing the masterful teaching of Professor Bernard M. W. Knox of Yale University, an educator wrote Encyclopaedia Britannica Films, "What you have done for us is priceless; you have persuaded key people that, given good men, teaching—and most impressive teaching—can be done on film."*



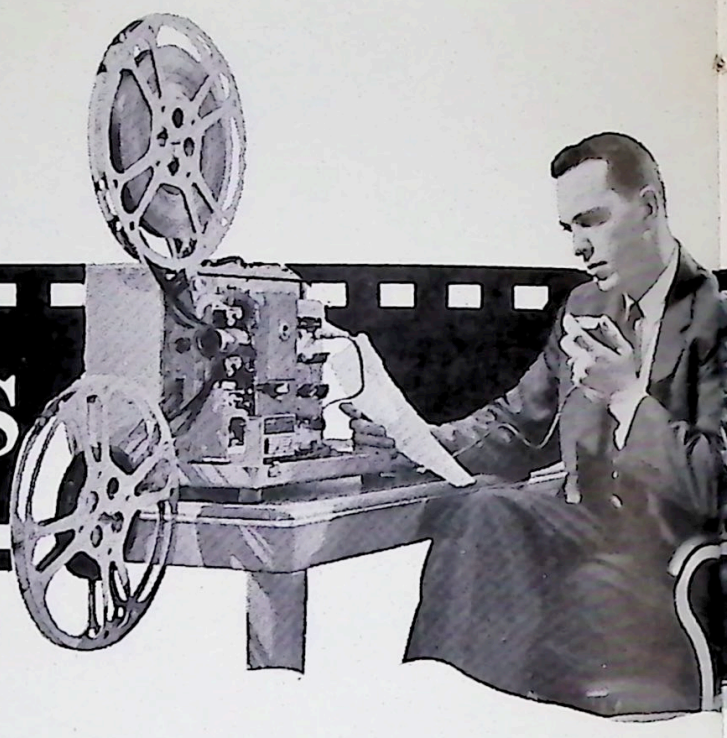
*Shakespeare's "Hamlet," which Professor Mack discusses with a clarity and pertinency never before heard or seen in the classroom, has its source in Scandinavian legend. Written about the turn of the century, the First Quarto was printed in 1603 and the Second Quarto in 1604. These editions contain texts whose differences from each other and from that of the First Folio constitute a difficult problem to Shakespearean scholars.*





*One hundred tellings are not equal to one seeing.*—CHINESE PROVERB

*Those who educate children well are more to be honored than they who produce them; for these only gave them life, those the art of living well.*—ARISTOTLE



# TODAY'S TEACHERS

## AMERICA'S BEST TEACHERS ARE DEDICATED MEN AND WOMEN DEVOTED TO THE ADVANCEMENT OF EDUCATION WHO ARE ESTABLISHING HIGHER STANDARDS OF LEARNING WITH THE WORLD'S GREATEST TEACHING TOOL—FILMS

THE sum of the world's knowledge has accumulated to a point where no one human being can know more than a tiny fraction of what man has thought and accomplished through the ages. Yet, in the complexity of modern living, the necessity for broader and deeper learning compounds with each generation. There is ever more material to be taught to more students by proportionately fewer teachers.

One classroom every six minutes for the next ten years is needed for educational facilities to catch up with the present population explosion. This fall forty-eight million pupils answered the school bell—two million more than can be adequately handled in existing schools; this number is expected to double in twenty years. The million and a half teachers now in the nation's classrooms represent a shortage of two hundred thousand qualified teachers and within the next ten years five hundred thousand more dedicated men and women will be needed in the teaching profession.

Fortunately, there is an answer to these problems and it is a good answer—one worthy of the educational ideals of a nation that historically set the standard of educational opportunity for all. It is an exciting answer because it is a forward step, not just an attempt to maintain an outmoded status quo. It is an answer that is ready now and has already proved its tremendous potential for providing classroom teachers with the means of teaching more students and teaching them better.

This answer is the educational motion picture, which brings the whole world into the classroom, adapted to the needs and abilities of the grade level and designed to stimulate and satisfy the pupil's natural thirst for understanding of the "why's" and "how's" of the world in which he lives. That this answer is enthusiastically endorsed by teachers is evidenced in their thousands of grateful letters of praise to Encyclopaedia Britannica Films and their flood of film requests to their school superintendents.

It is the teachers themselves who are in the forefront in making teaching by film the fastest growing development in the history of American education—and at a saving in teachers and buildings, since it makes larger classes feasible. The educational film's potential for presenting new concepts has already begun to stimulate important revision and expansion of curriculum content.

Rather than replacing teachers, films provide a better and more efficient way of using them, and the very best teachers are the greatest and most enthusiastic users of this versatile tool. Rural schools are especially benefited by the variety of courses and the high level of film teaching, which are usually available only to students in large urban school systems.

Only twenty per cent of today's licensed teachers have been trained to teach with motion pictures, but such training is rapidly increasing. California and Pennsylvania will not license a teacher who has not been so trained and many teachers' colleges now require an audio-visual course for graduation. An understanding of the teaching advantages of films and how they should be integrated into the curriculum can be gained by teachers without such training through the Encyclopaedia Britannica films, *Bring the World to the Classroom, Making Films That Teach, New Tools for Learning* and *Using the Classroom Film.* Teacher's Film Guides, available with each film produced by Encyclopaedia Britannica, also aid teachers in planning by giving a complete summary of the film content as well as by offering suggestions for pre- and post-showing class activities.

The ideal school has a film library with depth as well as breadth and an audio-visual director, working on an adequate fixed budget, who aids teachers in coordinating films with their curriculum and checks to see that it is done properly. This school has a projector on every floor and every teacher is qualified to run it. Every classroom can be turned into a darkroom and there is a viewing room where teachers can preview films before showing them.

Thomas Edison hailed his first movie camera of seventy years ago as the greatest of all mass-educational devices and it has been proved that intelligent use of properly made films saves time and effort in teaching. More facts, concepts and skills are learned in less time and students are motivated to further learning. Films also supplement the facilities of any single school by providing superior laboratory equipment, taking the place of field trips and doing other things a classroom teacher cannot do.

Textbooks may meet all the official standards of pedagogy and loyalty, but they are often dull and lifeless. Science and mathematics textbooks tend to go out of date faster than they can be profitably written and published; the situation is even worse in other subjects. Encyclopaedia Britannica Films not only supports a continuous program of revision, but exchanges new films for out-dated reels at a marked reduction. Though a school's book library may be out of date, its Encyclopaedia Britannica Film library never is.

In the United States, when a problem can no longer be answered by past procedures, new answers have always been found. Thus it is with education. The educational film is the most versatile teaching tool known to man and the best answer to the nation's awesome classroom needs and teacher shortage. ♦

*The next decade is crucial. There simply won't be enough teachers to handle the tremendous increase in enrollment.*

—ROBERT F. GOHEEN, *President, Princeton University*

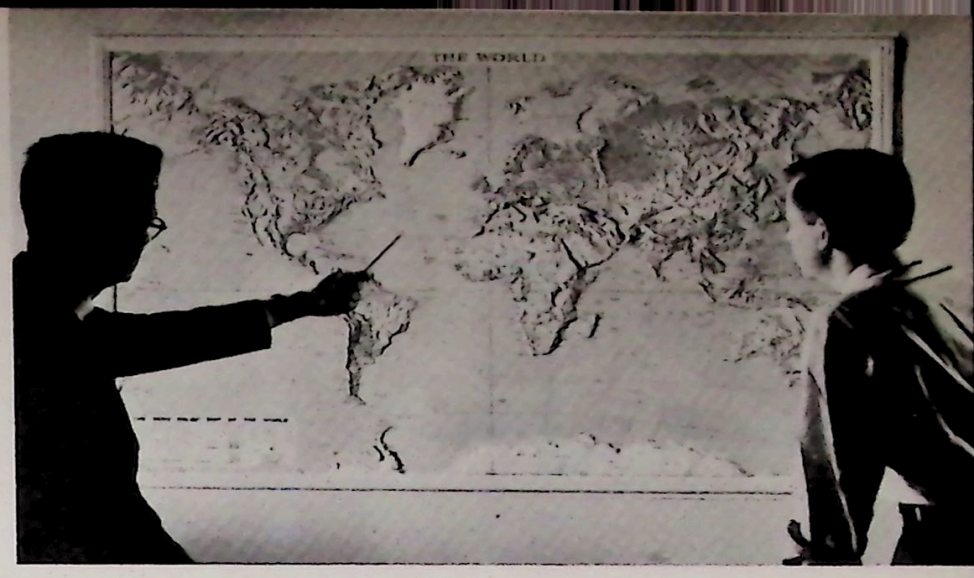
*About 2,500,000 teachers on all levels will have to be trained by 1975.*

—U. S. BUREAU OF LABOR STATISTICS

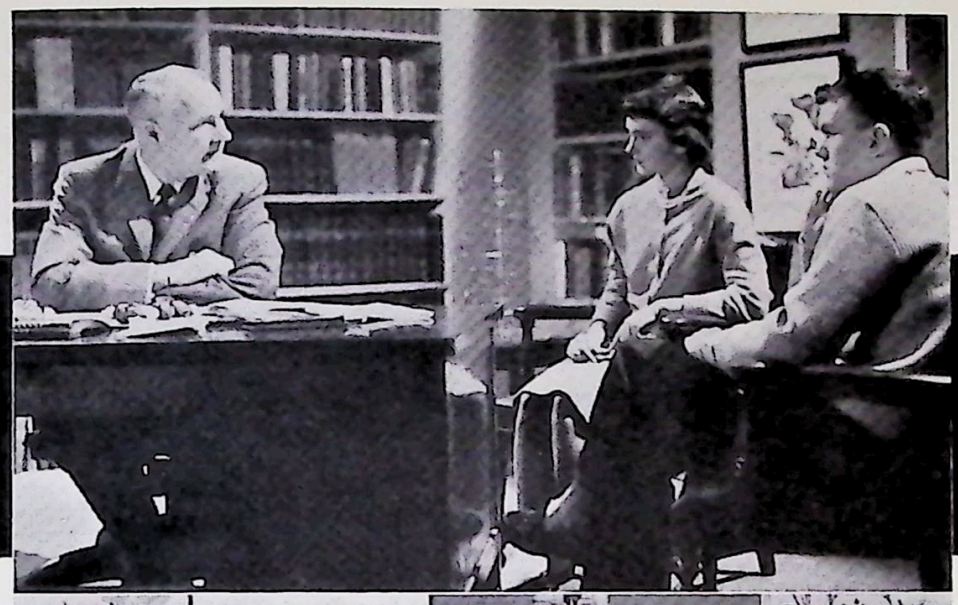
*Nothing can replace the teacher, but there are some things a film can do that a teacher cannot.*—MAURICE B. MITCHELL

*A teacher who is attempting to teach without inspiring the pupil with a desire to learn is hammering on cold iron.*

—HORACE MANN

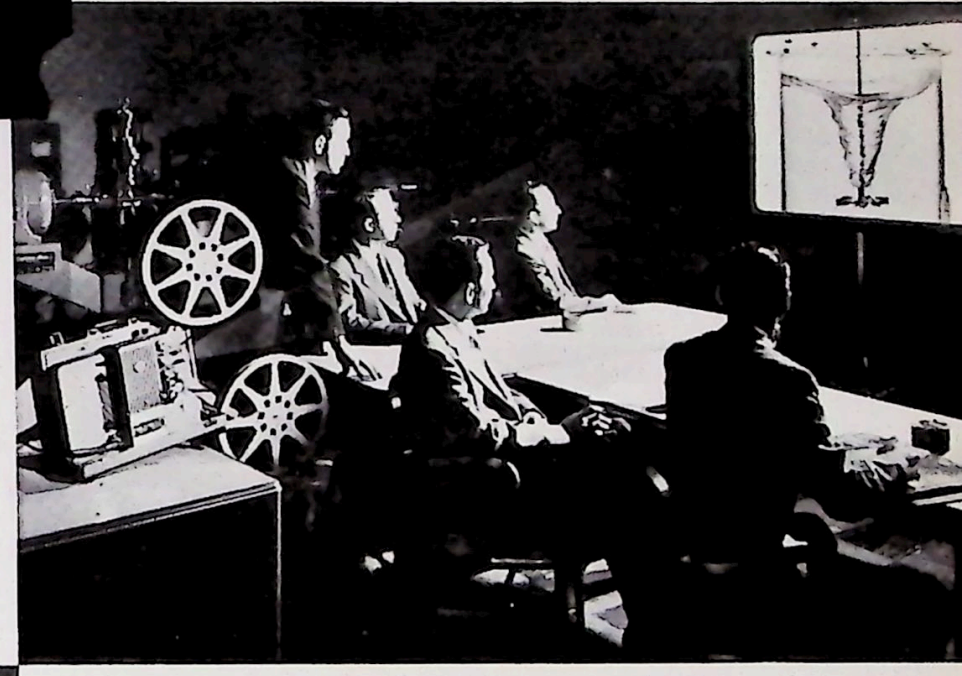


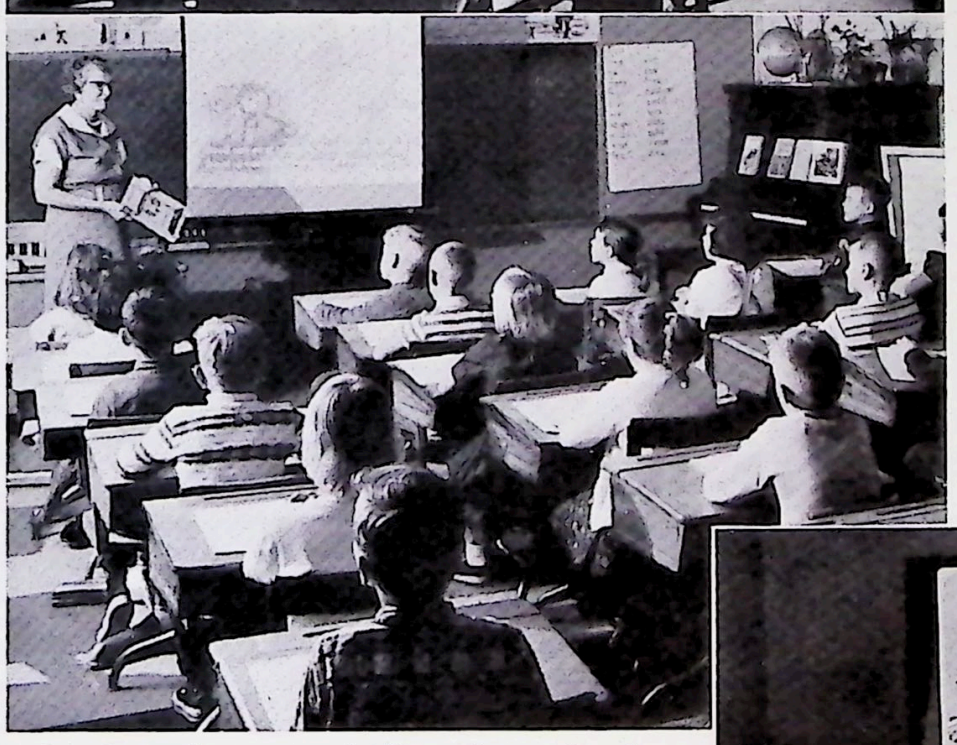
*A teacher must be just, courteous and professional in all his relations with pupils, and consider their individual differences, needs, interests, aptitudes and backgrounds.*



*A teacher is a person with a touch of immortality, and he should be most envied among men. His profession should be the most sought after, the most carefully prepared for, the most universally recognized. And believe me, as America grows in mental and cultural stature, it will be.*

—SAMUEL B. GOULD

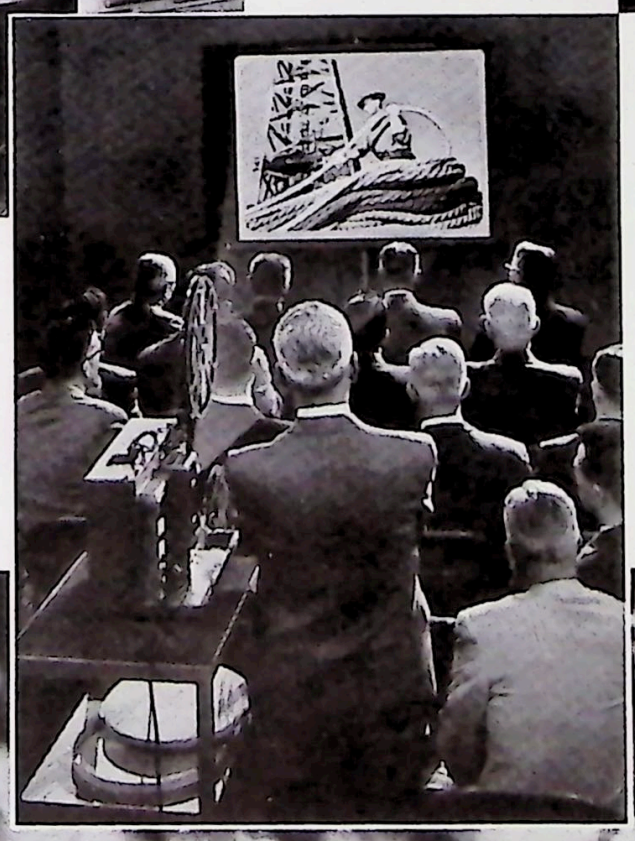




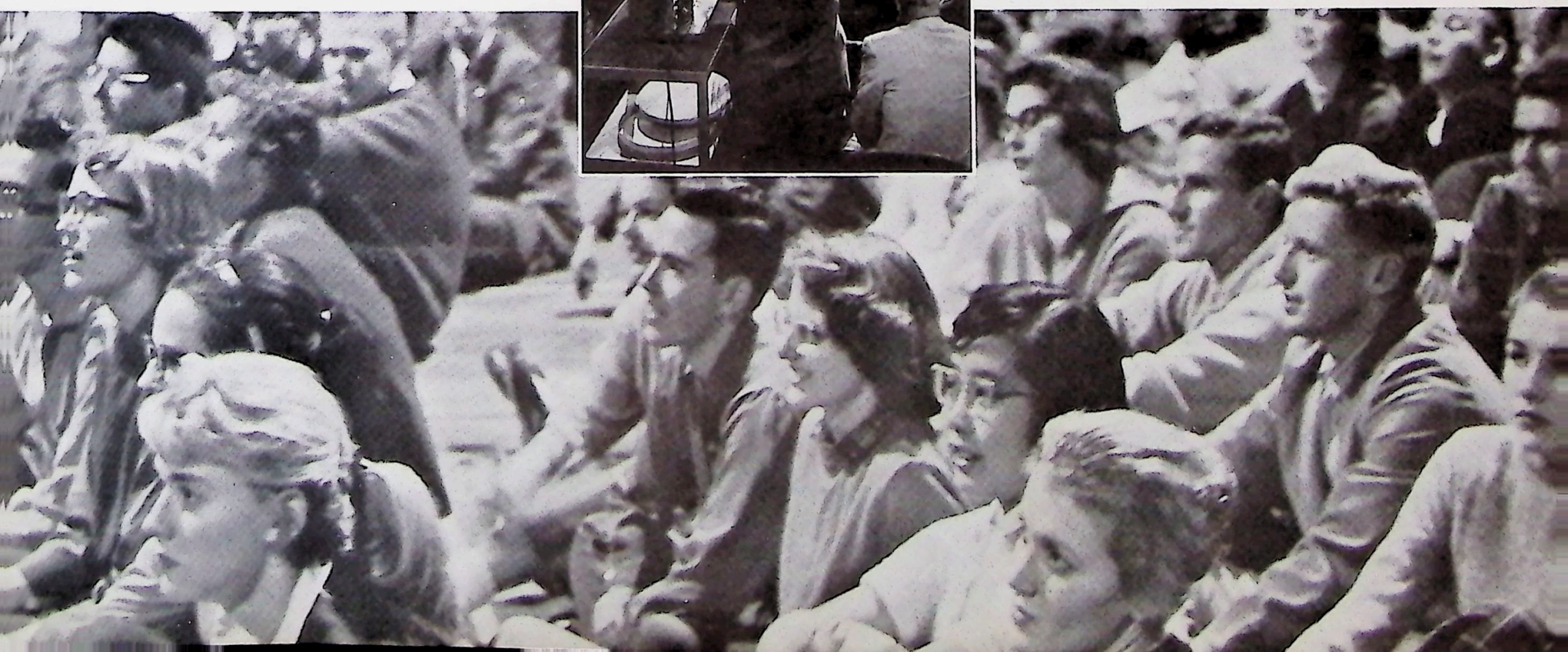
*Good teachers are dedicated people—the heart and soul of a good school system.*

*Today's teachers work together to develop better audio-visual programs through cooperative effort, continually weighing and improving them in the light of tested educational methods to give the curriculum—what pupils do in school—more meaning and significance for the students.*

*A teacher affects eternity; he can never tell where his influence stops.*—HENRY ADAMS

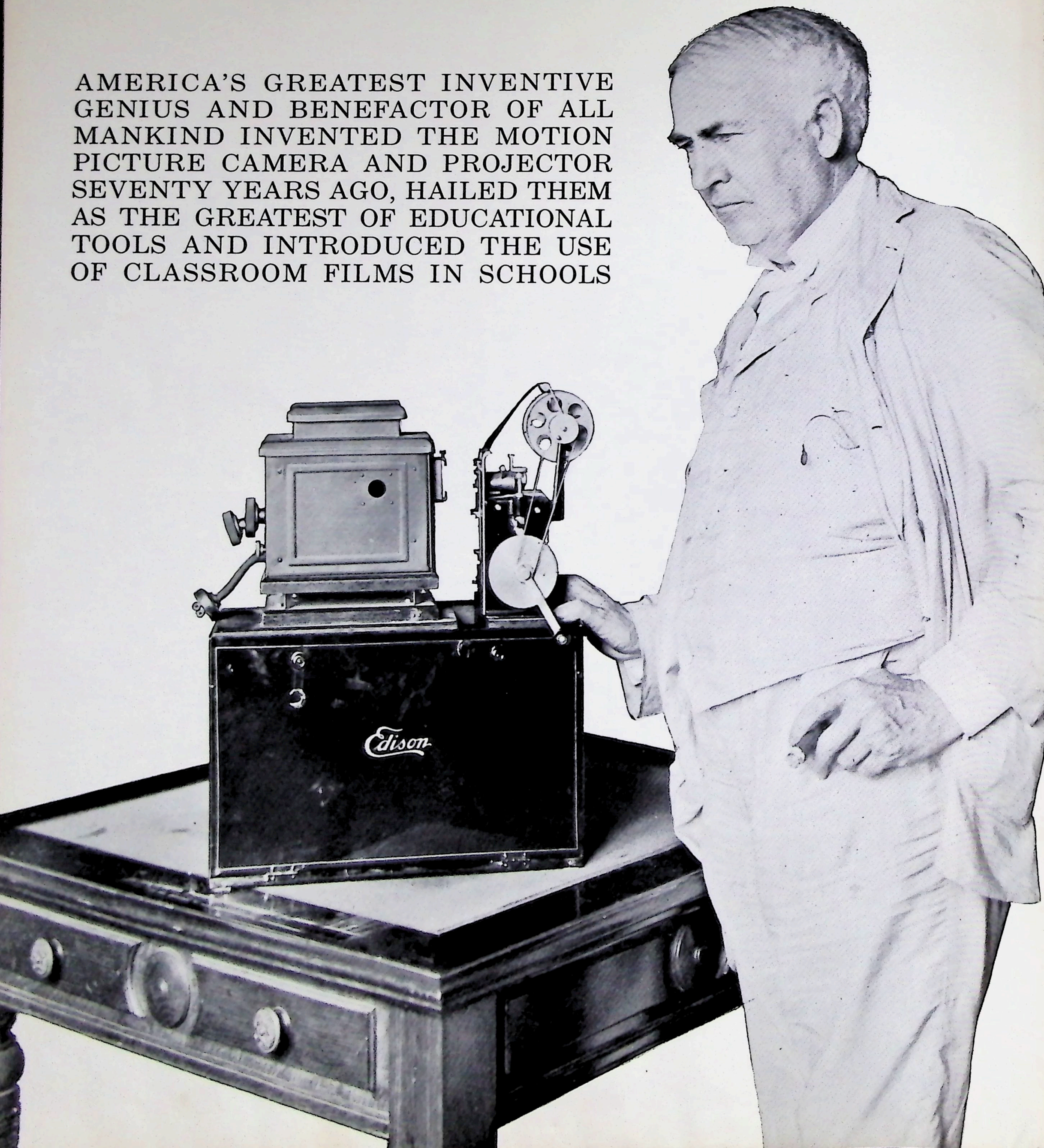


*Teachers are more than any other class the guardians of civilization. They should be intimately aware of what civilization is, and desirous of imparting a civilized education to their pupils with the most modern teaching devices.*—BERTRAND RUSSELL



# Thomas A Edison

AMERICA'S GREATEST INVENTIVE GENIUS AND BENEFACTOR OF ALL MANKIND INVENTED THE MOTION PICTURE CAMERA AND PROJECTOR SEVENTY YEARS AGO, HAILED THEM AS THE GREATEST OF EDUCATIONAL TOOLS AND INTRODUCED THE USE OF CLASSROOM FILMS IN SCHOOLS



*Books will one day be obsolete in the schools. Students and scholars will be instructed through the eye. It is possible to teach every branch of human knowledge through the motion picture. Our school systems will be completely changed by films in the years to come.*—THOMAS A. EDISON

THE goal of Thomas Alva Edison of revolutionizing the school curriculum through the use of educational films, made possible by his motion picture camera and projector, has been a long time in reaching realization, but today, seventy years later, its great potential has finally obtained widespread acceptance among all forward-looking educators. The motion picture camera is one of the most important of over one thousand patents granted to Edison during his lifetime—patents for developments whose effects upon the entire world are incalculable and unending.

America's greatest inventive genius was born at Milan, Ohio on February 11, 1847, the son of Samuel Ogden Edison, Jr., a stern and tough-minded man, and Nancy Elliott Edison, whose love and understanding were the principal impetus to her gifted son. His formal education was limited to three months in the public school, due to his inability to adjust to the school atmosphere. From his mother, young Thomas Alva learned to write, though with a spelling more original than correct, and to read and figure, but the most important thing she taught him was the love and purpose of learning. He was not much more than ten years old when he set up his first laboratory in the cellar, often secluding himself all day, studying chemistry and designing his first telegraph set.

The financial situation of the Edison family was often precarious and the youngest son was only twelve when he went to work on the new railroad between Port Huron and Detroit, selling newspapers and candy. Soon afterwards an accident left him deaf and, although he represented this affliction as an asset, protecting him from disturbing noise, he once wrote in his diary, "I haven't heard a bird sing since I was twelve."

While working on the railroad, Edison installed his little cellar laboratory at one end of the half empty baggage car, working there during the layover in Detroit. At fifteen he left the railroad to study telegraphy, becoming one of the fastest receivers and transmitters of his time. He was often fired, however, because of his resistance to office discipline. His entire salary, except for the smallest amount on which he could survive, was spent for equipment and books.

Countrified and threadbare, Edison traveled the country as a telegraph operator. It was at the end of this period, in 1869, that his first patent was granted—for the development of a telegraphic vote-recording machine, a device which got no further than the patent office. Drifting to New York on borrowed money, he was offered a job as general manager of the Gold Indicator Company, soon to become a Western Union subsidiary.

In the year that followed, he took out several patents covering telegraphic innovations, which he sold to Western Union for $40,000. With orders from Western Union for 1,200 stock tickers totaling nearly half a million dollars, Edison, at the age of twenty-four, set up shops in Newark, working as both inventor and manufacturer of electrical products.

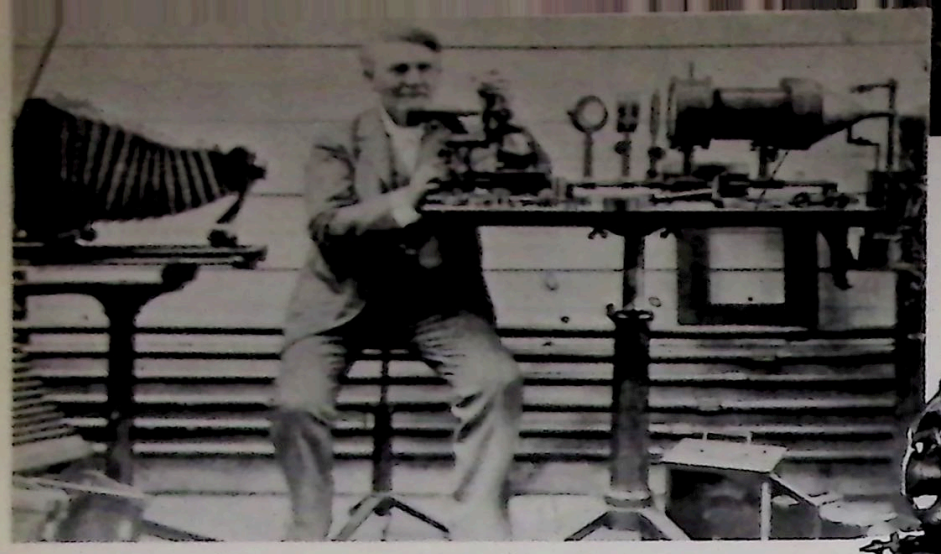
His tremendous preoccupation with work was scarcely interrupted when, on Christmas Day, 1871, he married Mary Stilwell, a worker in his shop. Almost ten years younger than her husband, she built her life around him. Edison was already recognized as a great man, strong-willed and often completely engrossed by ideas Mary could never understand. Their first child, Marion, was born in 1872; Thomas, Jr., arrived in 1876, and in 1878 a second son, William Leslie, was born.

After six years in Newark, Edison moved his laboratory in 1876 to

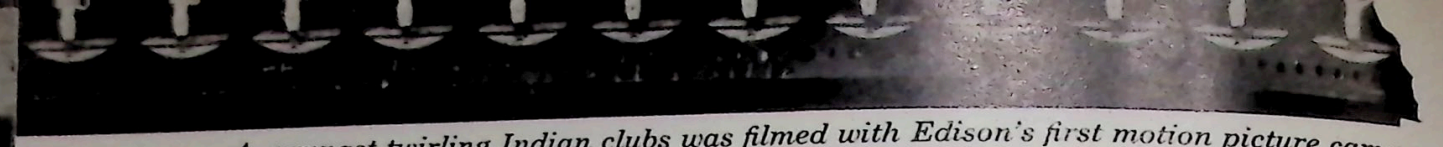
*Both of Edison's wives were far younger than he, but Mina Miller, whom he married soon after gentle, self-effacing Mary Stilwell died, possessed a more forceful character.*

*Edison contended that his mother, Nancy Elliott Edison, was the making of him. At 14 he had already worked 2 years on the railroad, studying and experimenting every free moment. There was no understanding between the boy and his father, Samuel Edison, Jr.*

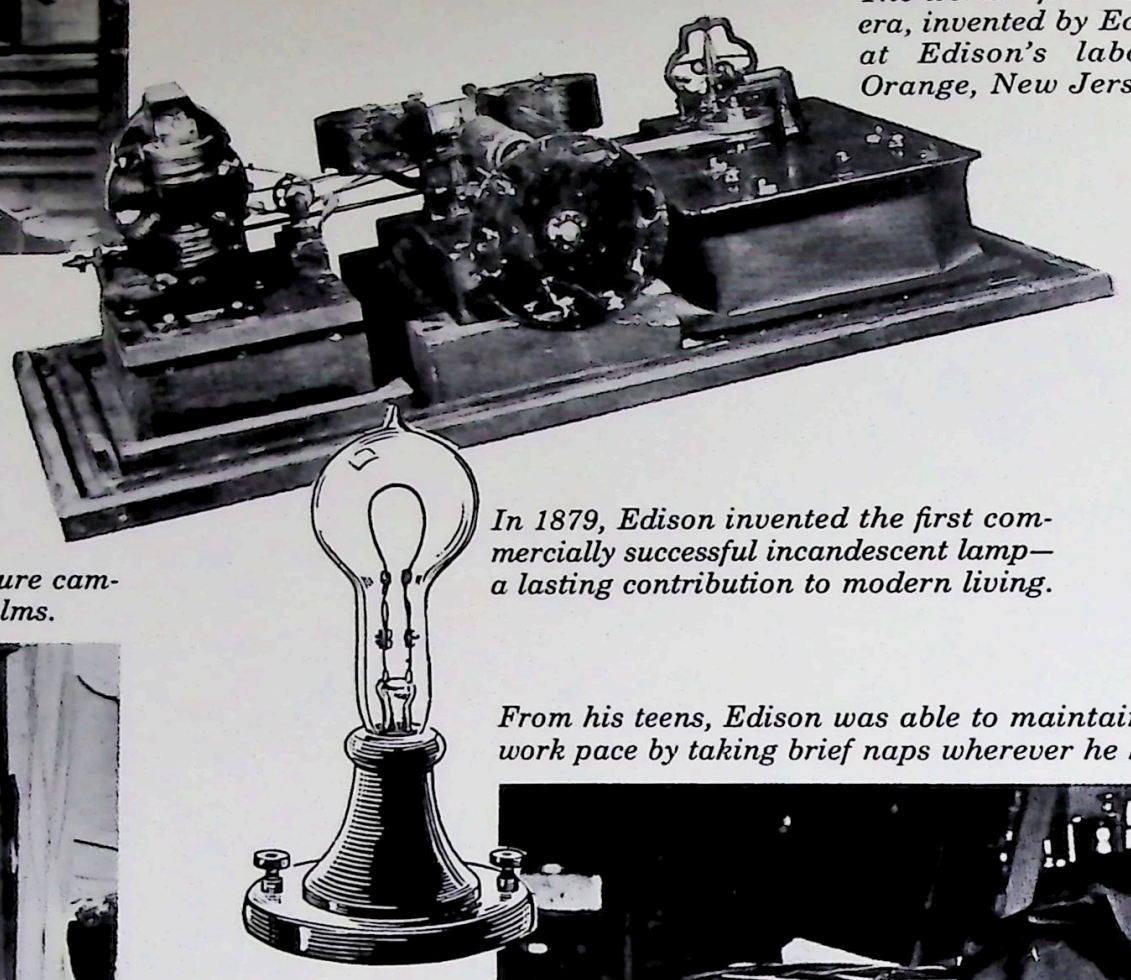
*While in Washington, D.C. in the spring of 1878 to demonstrate his recently patented tin foil phonograph before the National Academy of Science, Thomas A. Edison had this portrait with the new invention taken by the famous Civil War photographer, Mathew Brady. He also paid a visit to the White House, where he recorded and reproduced the voices of President and Mrs. Rutherford B. Hayes with his phonograph.*



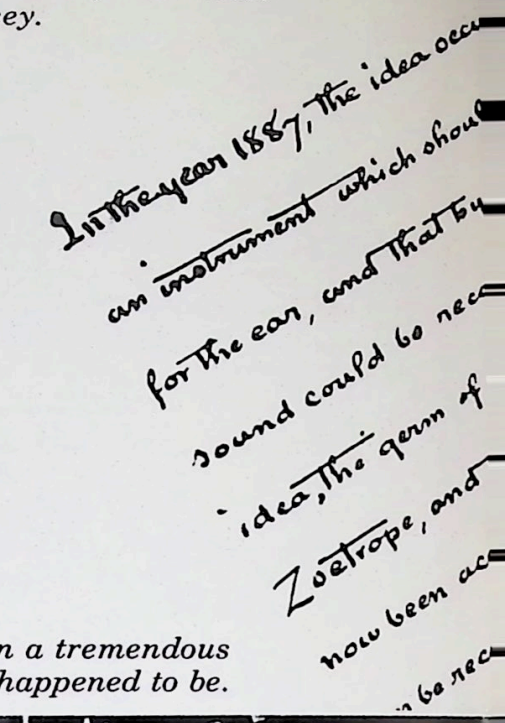
*The materials and mechanisms Edison used in his motion picture camera were not new, but he effected distinctively new and practical results by adapting them.*



*A gymnast twirling Indian clubs was filmed with Edison's first motion picture camera.*



*The world's first motion picture camera, invented by Edison, is on display at Edison's laboratory in West Orange, New Jersey.*


In the year 1887, the idea occu
an instrument which should
for the ear, and that by
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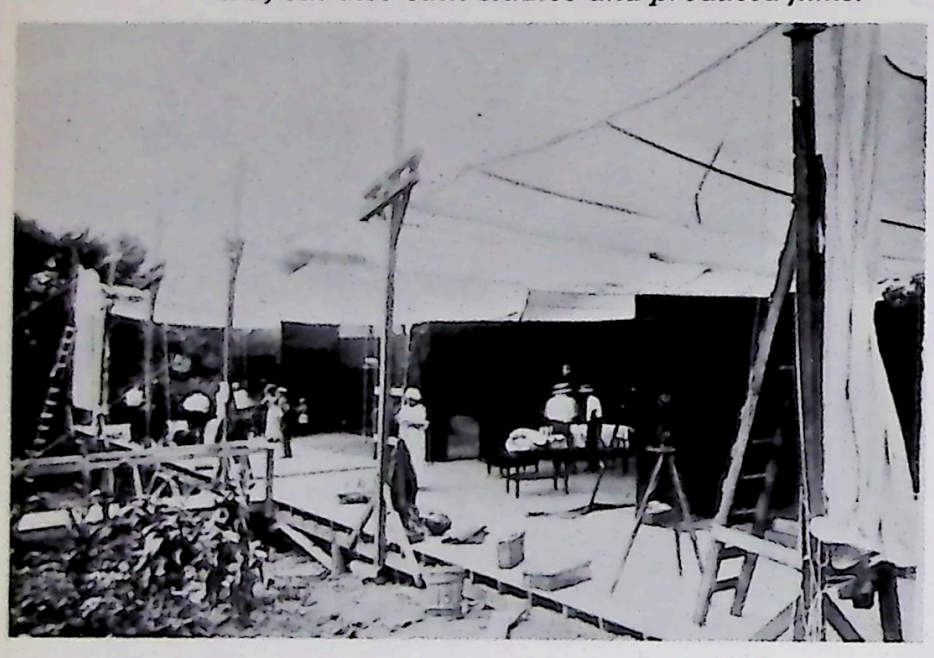
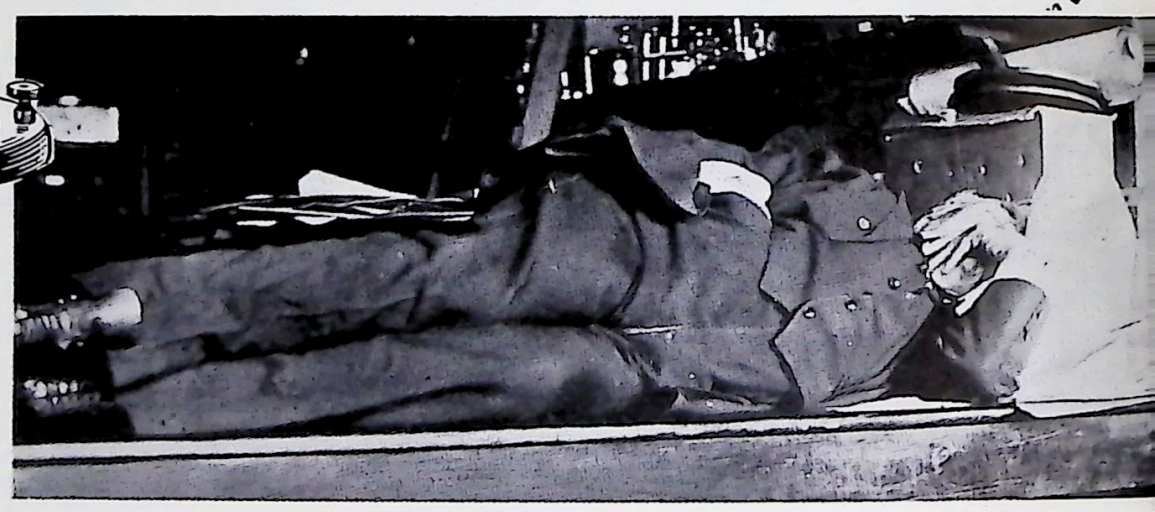
*In 1879, Edison invented the first commercially successful incandescent lamp—a lasting contribution to modern living.*

*Edison not only invented the motion picture camera, but also built studios and produced films.*



*From his teens, Edison was able to maintain a tremendous work pace by taking brief naps wherever he happened to be.*



Menlo Park where he tackled the same problem that was attracting Bell in Boston—multiple telegraphy. Western Union, which had first option on all Edison patents, and Bell pirated each other's best features—Bell used Edison's mouthpiece and Western Union used the Bell receiver.

Turning from the telephone, Edison made a rough sketch of a cylinder covered with tin foil and turned with a hand crank. When constructed at a cost of $18, the designer set it up and shouted into a horn, "Mary had a little lamb." After a few adjustments, a squeaky voice shouted the same words back at him. Ten years later, he developed a motor-driven machine with cylindrical wax records which gained rapid popularity and, still later, he invented a disk form for music and the "Ediphone" for office dictation.

In 1878, Edison tackled the unsolved problem of electric lighting for home use, lighting that would compete in cost, candle power and convenience with the gas jet. Working on paper, he satisfied himself that the problem was solvable on his own terms and then went to work on a lamp with a carbon filament sealed in an evacuated glass globe. In the waning days of 1879, thousands of people thronged to see the small electric lamps burning in his shop and on neighboring roads.

When his wife, not yet thirty, died in 1884, Edison buried himself even deeper in his work. The following year, however, while visiting friends in Boston, the thirty-eight-year-old widower was introduced to eighteen-year-old Mina Miller, a lovely brunette who impressed Edison with her dignity and self-assurance. A young woman of strong character and will, when she later married Edison, it was with full awareness that he was one of the world's most noted men. But this did not stop her from feeling that he could be improved and in due time his rough exterior was gradually smoothed a little. Three children were also born to this marriage—Madeleine in 1888, Charles in 1890 and Theodore in 1898.

Edison's enterprises continually outgrew their facilities. In 1881, he purchased property near the East River in New York City for the manufacturing end of the electric light business—a business that was eventually to become the General Electric Company. Outgrowing this location, the operation was moved to vastly larger quarters in Schenectady in 1886. The following year construction began on the West Orange laboratory buildings, half a mile from Glenmont, the home he built for his new bride.

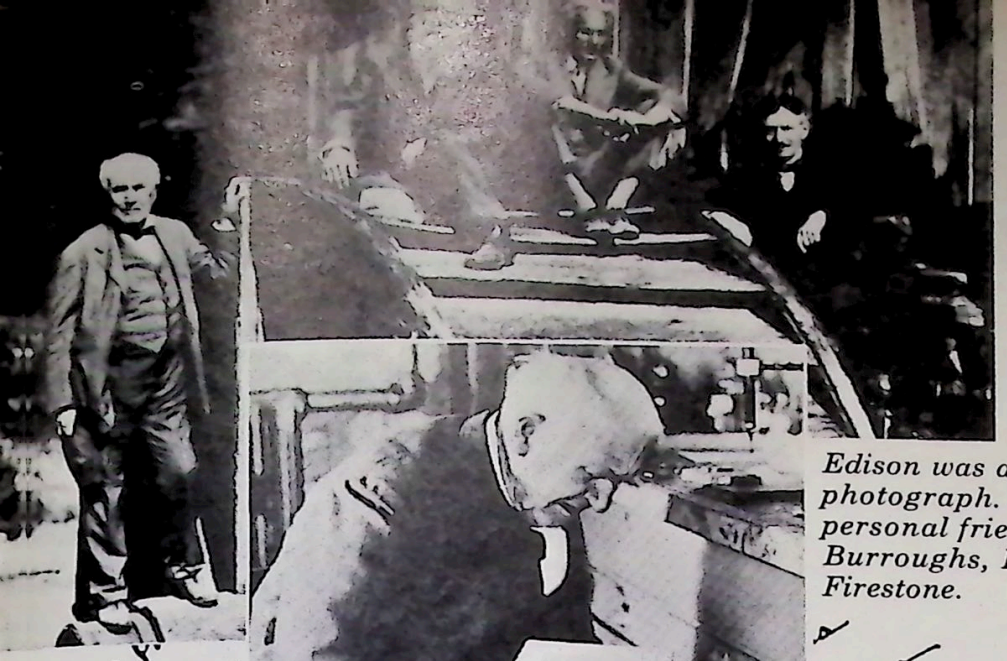
Patents for inventions and developments continued to accumulate. In 1883, he patented what became known as "the Edison effect," the passage of electricity from a filament to a plate of metal inside an incandescent lamp globe—a forerunner of the radio tube. Two years later he developed a method of transmitting telegraphic signals by induction between ships or from moving trains. From 1891 to 1900, he worked on a magnetic method of concentrating iron ores and from 1900 to 1910, he developed a new kind of storage battery, using an alkaline solution with nickel hydrate as the positive and iron oxide as the negative material.

He was admitted to the National Academy of Sciences in 1927, four years before the news of his death, on October 18, 1931, was broadcast to the world that owed so much to him—over the same telegraph, telephone and radio to which he devoted so much of his genius.

For many years, however, even while these inventions were being perfected, the motion picture camera interested Edison more than any other project. For a century or more men had used a variety of mechanical tricks with pictures in order to give the illusion of things in motion and Edison kept himself informed on all advances in photography. He had recorded the movement of sound and felt that the same thing could be done for sight in some way to record motion.

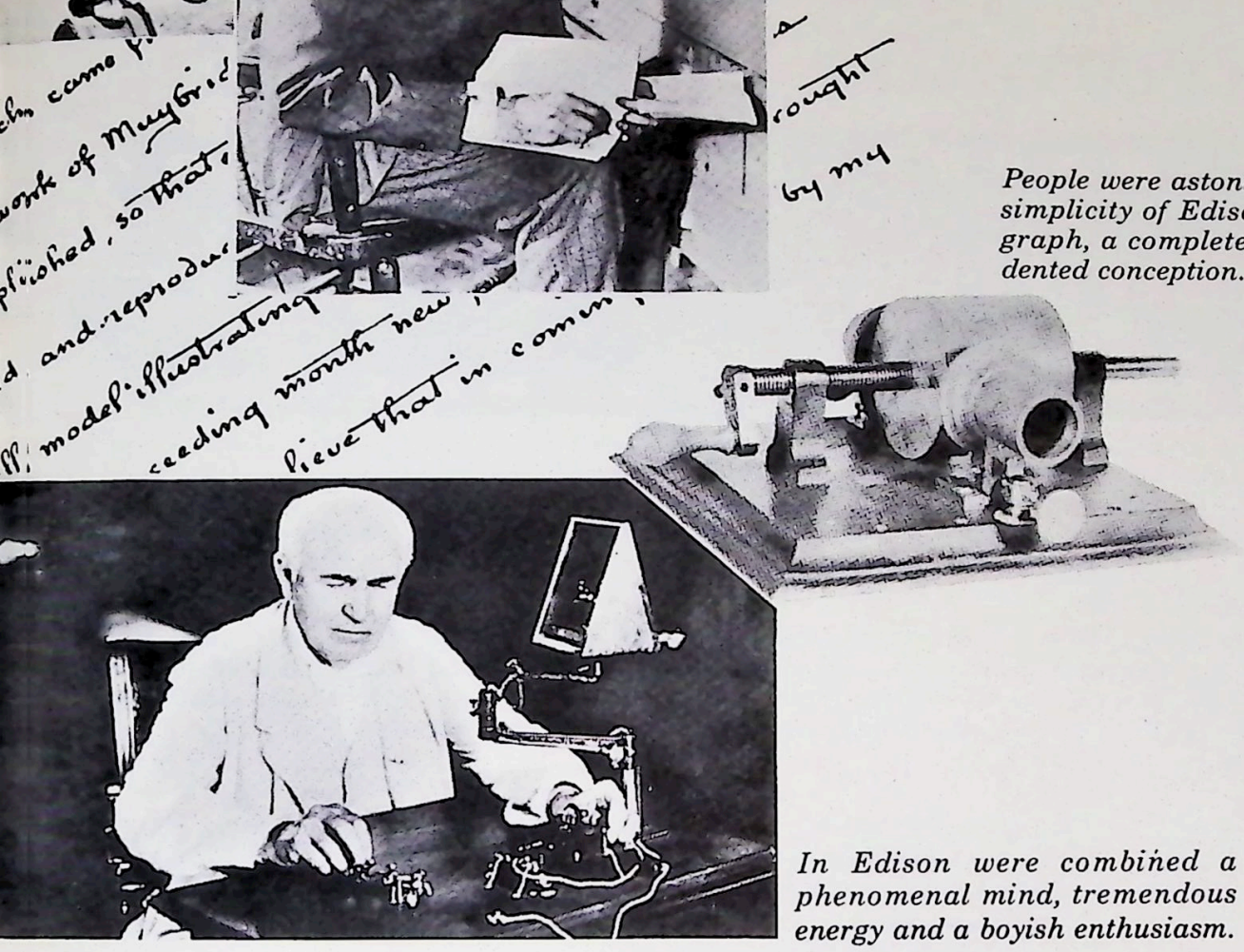
Ten months of experimentation, studying the nature of a camera and viewing apparatus arranged both to take and view pictures in motion, gave him a clear idea of what he wanted, but not how to get it. The advent of film, more pliant and easier to use than glass plates, provided the turning point. With it, he was able to record movement for several seconds at a time. The same machine was also used, at first, for viewing the pictures directly through a magnifying lens. This camera was enlarged and improved, becoming the ponderous machine, almost a ton in weight, in use between 1890 and 1894—the parent of all modern motion picture cameras. The width of the film, 35 mm., is still standard today.

The first "Kinetoscope Parlor," which opened on lower Broadway in New York in 1894, was billed as "The Wizard's Latest Invention." Crowds waited all day and far into the night in long lines to look through the eyeholes of five kinescopes for ninety seconds and see pictures that moved. Ten years later, *The Great Train Robbery,* the precursor of the



*Edison was a vigorous 71 in this 1918 photograph. He is shown with his personal friends, (left to right), John Burroughs, Henry Ford and Harvey Firestone.*

*Today's modern classroom projector, realizing Edison's dream of education through films, evolved from this historic experimental model.*



*People were astonished at the simplicity of Edison's phonograph, a completely unprecedented conception.*

*Edison got along well with Dr. Charles P. Steinmetz because the mathematical physicist never mentioned his weak point, mathematics.*



*In Edison were combined a phenomenal mind, tremendous energy and a boyish enthusiasm.*

plotted motion picture, was distributed by Edison's tar paper studio, known as "Black Maria."

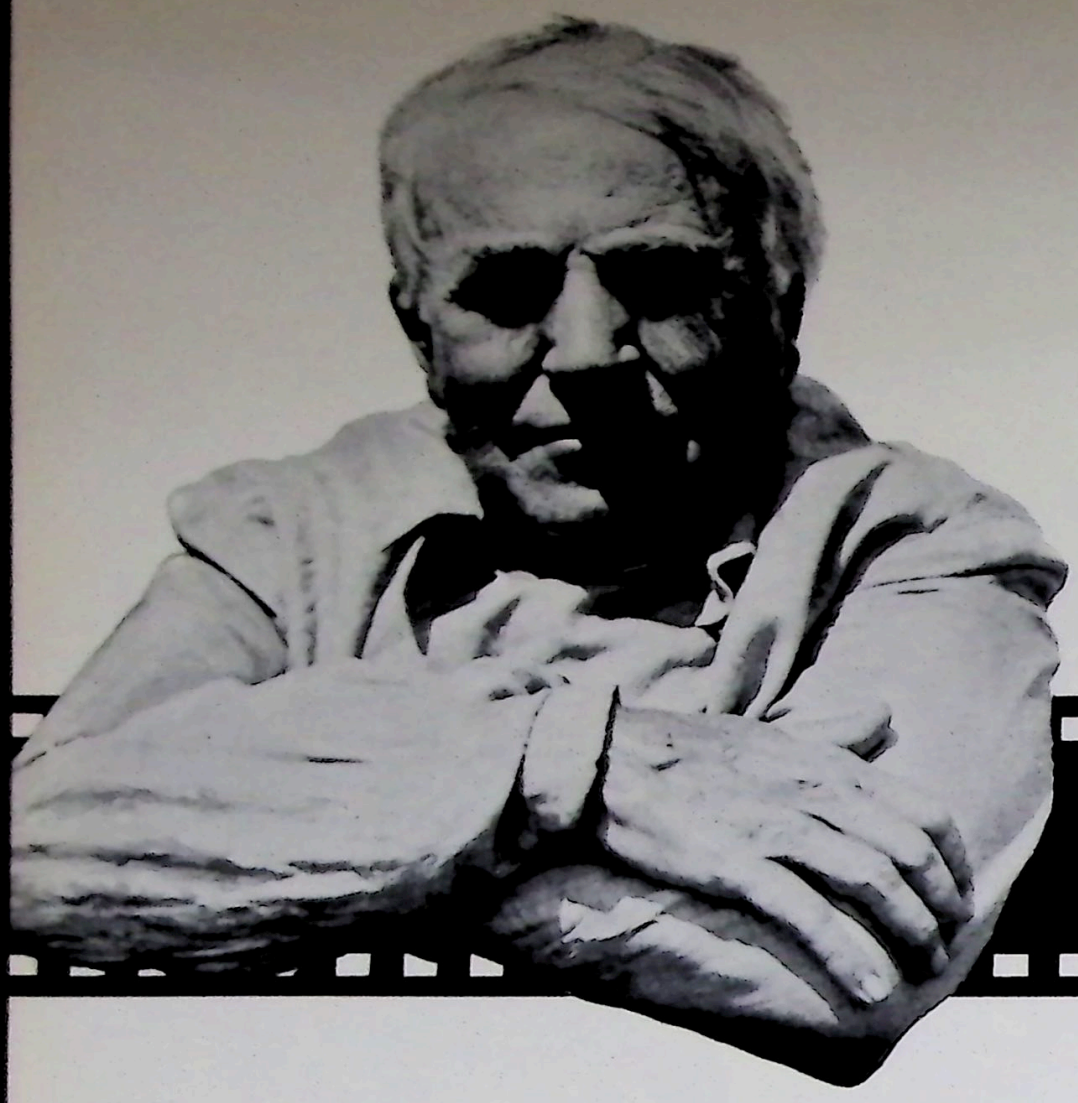
One of the earliest films produced in "Black Maria," which revolved to keep the stage in sunlight, was an educational picture on dental anaesthesia, then almost as radical an innovation as the motion picture. Twenty years later, Edison was still producing educational films, historical subjects and science films on insects and microscopic pond life. Though widely shown in theatres, these films were conceived by Edison as teaching films for the classroom and he predicted that every branch of human knowledge would eventually be taught through the motion picture. Although his prophecies have been long in coming true, educators are now thoroughly convinced of the outstanding advantages of teaching on film.

In fact, by 1909, leading educators were writing in support of wider use of motion pictures. An ambitious film production program for mass training was begun during World War I, but the war was over before it could be completed. Nevertheless, film training was continued as a regular Army activity and, with the outbreak of World War II, expanded tremendously. Through the use of films, supplemented by drills, manuals and textbooks, training time was cut by forty per cent.

This proof under fire not only assured films a permanent place in Army training, but proved an impetus to classroom teaching by film, serving to change the school curriculum into something more interesting, more efficient, broader and deeper. Improvements in projection equipment and in the quality of films since the war have also been important factors in the present enthusiasm for filmed teaching. For at last, as Edison predicted, "Motion pictures are and will be a great factor in the education of the public." Thus, the world of knowledge owes a tremendous debt to Thomas Alva Edison, the fantastic "Wizard of Menlo Park," who, although his own formal schooling was limited to only three months, was instrumental in bringing about this exciting, revolutionary improvement in the techniques of teaching, learning and education. ♦

*A warm friendship grew between Henry Ford and Edison in their late years.*

*Edison's son Charles, shown here with his famous father in 1928 at a radio broadcast, served as Secretary of the Navy and Governor of New Jersey.*



*As former President of the United States, I knew Thomas A. Edison and took part in paying honor to this great American while he was alive. Edison repelled the darkness and brought our country great distinction throughout the world. He brought benefaction to all of us.*

HERBERT HOOVER

# from the Wisdom of Thomas A. Edison

We live and grow by new knowledge.

The film is the most effective instrument of education.

Learning ought to be made easy and pleasant. It can be done with the aid of moving pictures. I could tell anyone a great deal about a dynamo and it would be hard for him to understand; but I could show everything in a few pictures so that a child would understand—and would never forget.

The photograph first suggested the motion picture camera. I had been working for several years on my experiments for recording and reproducing sounds, and the thought occurred to me that it should be possible to devise an apparatus to do for the eye what the phonograph was designed to do for the ear. That was the broad purpose, but how to accomplish that purpose was a problem which seemed more impossible the longer I studied it. It was in 1887 that I began my investigations, and photography was in a decidedly crude state of development.

Our youth stores its mind with that which it finds most interesting.

If we educate too abruptly—if we cram the mind with facts memorized for themselves alone—what comes? Pure atrophy. This matter of education is a big question for the American people. It is of the utmost importance that every faculty should meet its environment. What is the use of crowding the mind with facts which cannot be utilized by the child because the method of their acquisition is distasteful to him?

Personally, I hold the brain above the book.

My mother taught me not only the three R's, but she implanted in my mind the love and purpose of learning. My mother was the making of me. She understood me; she let me follow my bent.

If a man wants to succeed, it is not a necessity that he should get his education at college. If he is to amount to anything, he will broaden himself out without the need of college training. What we need in America are more men with technical training, since we are a commercial country by nature. We have enough lawyers, doctors and literary men. There are plenty of openings for ambitious men in this country.

To say that our educators need education is merely to say of them what they are constantly proclaiming of themselves and everybody else in their own speeches. They know it and most of them are trying earnestly to get the education that they need.

It may seem curious, but the money end of the motion pictures never hit me the hardest. The feature that did appeal to me about the whole thing was the educational possibilities I thought I could see. I had some glowing dreams about what the camera could be made to do in teaching the world things it needed to know—teaching it in a vivid, direct way.

Progress is the thing that puts most books in the discard.

Every branch of education can be taught through books and motion pictures. Films already have done much to mold the public, young and old.

Talking machines can never do what motion pictures can do in forming the thought and habits of the world.

Let us take a class in geography. It seems to me that motion pictures offer here a rather astonishing substitute for the colorless, standardized lessons of the textbooks—not only an opportunity to teach directly from a busy world at work but with all of the atmosphere of adventure, romance, achievement. We could teach history, of course, in much the same way, and literature, and biology—and in our advanced courses, chemistry, geology, physics. There is no limitation to the camera. It is simply a matter of the right direction.

The child is a natural born "rubber neck." His curiosity is alert. Give him the chance and he will learn. One glance, if he sees the thing itself, is better than two hours of studying about a thing which he does not see.

The trouble with our way of educating as generally followed is that it does not give elasticity to the mind. It casts the brain into a mold. It insists that the child must accept. It does not encourage original thought or reasoning, and it lays more stress on memory than on observation. The result of accepting unrelated facts fosters conservatism. It breeds fear, and from fear comes ignorance. The seeing of things in the making is what counts. Then the mind can approach the gaining of knowledge without prejudice.

I firmly believe that the moving picture is destined to bear an important part in the education of the future. One may devote pages to the descriptions of the processes of nature to be learned by rote in the schools. Suppose instead that we show to the child the stages of that process of nature—the cocoon itself, the picture of the cocoon unfolding, the butterfly actually emerging. The knowledge which comes from the actual seeing is worth-while. The geography which comes from travel is better than the geography of the books; the next thing to travel is following the same scenes through the moving picture.

I should say that in years to come, textbooks as the principal medium of teaching will be as obsolete as the horse and carriage are now. I believe that in the next years visual education—the imparting of exact information through the motion picture camera—will be a matter of course in all of our schools, and that the printed lesson will be largely supplemental and not paramount.

We must be careful not to breed a race with untrained eyes.

Do you know that one of my first thoughts for the motion picture camera was to combine it with the phonograph? In fact, that was what primarily interested me in motion pictures—the hope of developing something that would do for the eye what the phonograph did for the ear. My plan was to synchronize the camera and the phonograph so as to record sounds when the pictures were made, and reproduce the two in harmony. As a matter of fact, we did a lot of work along this line, and my talking pictures were shown in many theatres in the United States and foreign countries. I even worked on the possibility of an entire performance of grand opera, for example, being given in this way. Another thought I had was that such a dual arrangement might record both the lives and the voices of the great men and women of the world. Can you realize the tremendous impetus this would be to the study of history and economics?

There is far more opportunity than there is ability.

The young man whose mind has been allowed to atrophy through lack of definite, continuous hard work has few possibilities or none. His time has passed. He's through before he starts.

There is no substitute for hard work.

Discovery is not invention, and I dislike to see the two words confounded. A discovery is more or less in the nature of an accident. A man walks along the road intending to catch the train. On the way his foot kicks against something and he sees a gold bracelet embedded in the dust. He has discovered that—certainly not invented it. He did not set out to find a bracelet, yet the value is just as great.

Everything comes to him who hustles while he waits.

Atrophy of perception afflicts America today. The eye sees, but no message goes from it to the brain. Despite unquestioned vision of the fact, there is no sensing of it by the individual before whom it is placed. It is seen physically but not mentally.

Why do so many men never amount to anything? Because they don't think.

The human mind cannot be analyzed as the piece of metal can be, but a good deal can be learned about it by finding out, first, whether or not it is really a thinking and remembering machine.

Humanity has been more right than wrong in its influences on youth.

It is curious that the better impulses of our humanity do not work as hard to spread their careful, helpful thought as the less worthy elements do to spread their evil thought and foolish reasoning. If this could be reversed, the world very quickly would become a better place to live in.

Motion pictures can be applied to a scientific, systematic course of memory training in the schools, taking the children at an early age when the mind is plastic enough to adapt itself most readily to new habits of thought. Most of our textbooks fail on two big counts. They are not sufficiently human, and their application is not sufficiently practical. Their tendency seems to be to look upon the whole process of education as a job of dull and uninteresting work—with the apparent argument that the duller and more uninteresting it is made the more credit there is for doing it.

Life itself, without the assistance of colleges and universities, is becoming an advanced institution of learning.

Education isn't play—and it can't be made to look like play. It is hard, hard work. But it can be made interesting work.

There will one day spring from the brain of Science a machine or force so fearful in its potentialities, so absolutely terrifying, that even man, the fighter who will dare torture and death in order to inflict torture and death, will be appalled, and so will abandon war forever.

The brain can be developed just the same as the muscles can be developed, if one will only take the pains to train the mind to think.

The stomach is the only part of man which can be fully satisfied. The yearning of man's brain for new knowledge and experience and for more pleasant and comfortable surroundings never can be completely met. It is an appetite which cannot be appeased.

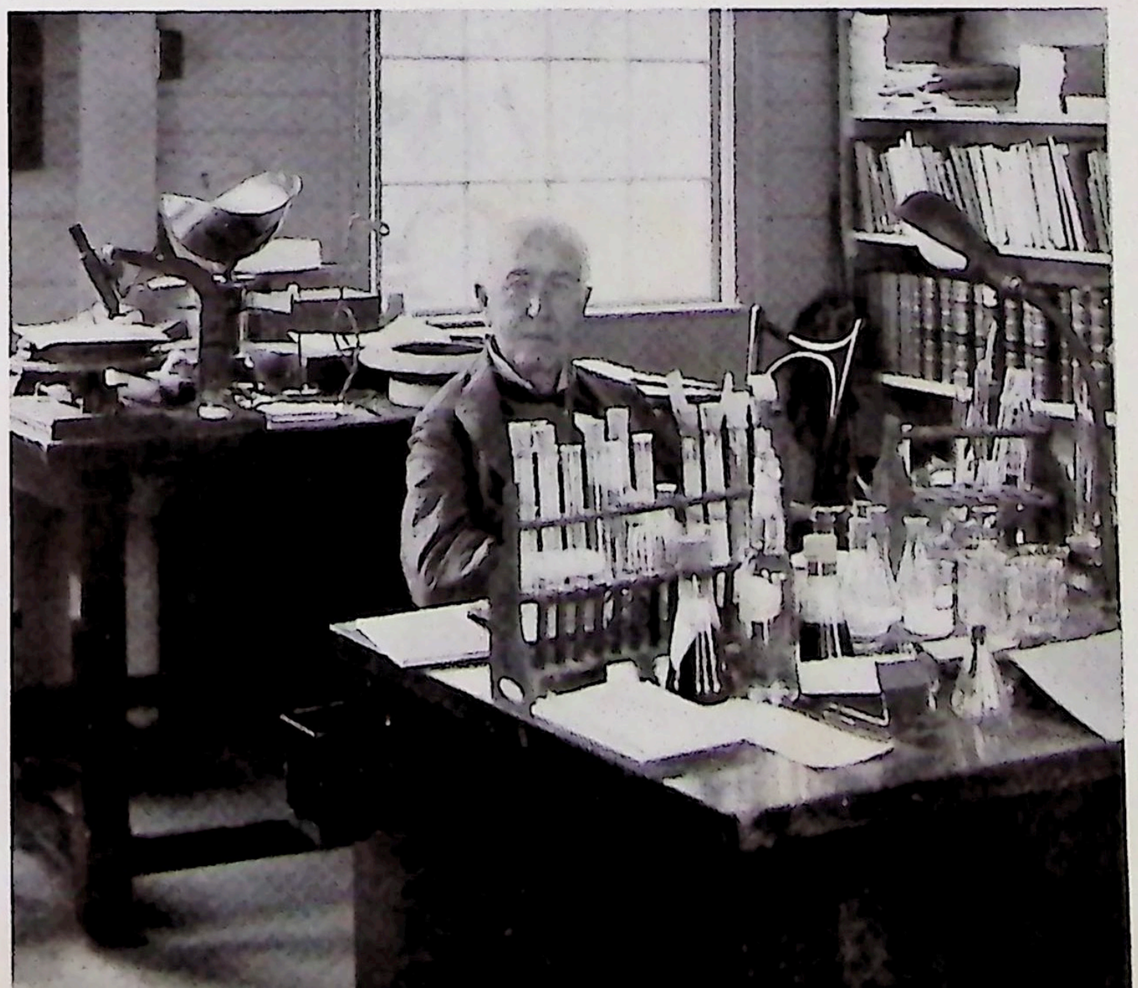
As human beings are now constituted, it is impossible for them to be very happy. The only ones who are continuously happy are the ones who, having little ambition, do small things of little importance. A man whose business it is to catch butterflies is probably pretty happy all of the time.

My gospel is Work—bringing out the secrets of nature and applying them for the happiness of man.

All over my shops I had signs put up bearing a quotation attributed to Sir Joshua Reynolds: "There is no expedient to which a man will not resort to avoid the real labor of thinking."

Restlessness is discontent—and discontent is the first necessity of progress. Show me a thoroughly satisfied man—and I will show you a failure.

I know this world is ruled by Infinite Intelligence. It required Infinite Intelligence to create it and it requires Infinite Intelligence to keep it on its course. Everything that surrounds us—everything that exists—proves that there are Infinite Laws behind it. There can be no denying this fact. It is mathematical in its precision.



# from the Wisdom of Edison

I introduced the use of motion pictures in schoolrooms and prepared educational pictures which, as I promised, would teach everything from mathematics to morality. Lessons were rendered so vivid that children would really want to go to school. Perhaps, some day, such methods could be perfected and all knowledge taught through motion pictures.

The inventor tries to meet the demand of a crazy civilization. Society is never prepared to receive any invention. Every new thing is resisted, and it takes years for the inventor to get people to listen to him and years more before it can be introduced, and when it is introduced our beautiful laws and court procedure are used by predatory commercialism to ruin the inventor. They don't leave him even enough to start a new invention.

I always welcome criticism. It helps me think and often shows me where I have been wrong.

I consider that the greatest mission of the motion picture is first to make people happy, to bring more joy and cheer and wholesome good will into this world of ours. And God knows we need it. Second—to educate, elevate, and inspire. I believe that the motion picture is destined to revolutionize our educational system, and that in a few years it will supplant largely, if not entirely, the use of textbooks in our schools. Books are clumsy methods of instruction at best, and often even the words of explanation in them have to be explained. I should say that on the average we get only about two per cent efficiency out of school books as they are written today. The education of the future, as I see it, will be conducted through the medium of the motion picture, a visualized education, where it should be possible to obtain a one hundred per cent efficiency. The motion picture has tremendous possibilities for the training and development of the memory. There is no medium for memory-building as productive as the human eye. That is another basic reason for the motion picture in the school. It will make a more alert and more capable generation of citizens and parents. You can't make a trained animal unless you start with a puppy. It is next to impossible to teach an old dog new tricks. I do not believe that any other single agency of progress has the possibilities for a great and permanent good to humanity that I can see in the motion picture. And those possibilities are only beginning to be touched.

People with good hearing have become so accustomed to the uproar of civilization that that uproar has become necessary to their lives. If all noise suddenly should stop on Broadway, Broadwayites would faint away.

The child develops through exercise. Give him plenty of exercise for body and brain. The more he works his arm, the bigger the muscles; the more the faculties are exercised in a normal way, the greater the brain. The folds of the brain grow deeper through observation; they grow fallow from disuse.

The very first thing an executive must have is a fine memory. Of course it does not follow that a man with a fine memory is necessarily a fine executive. He might have a wonderful memory and be an awful chump in the bargain. But if he has the memory he has the first qualification, and if he has not the memory he lacks the first qualification and nothing else matters.

Grouches are nearly always pinheads, small men who have never made any effort to improve their mental capacity.

I've been in the inventor business for many years, and my experience is that for every problem the Lord has made He has also made a solution. If you and I can't find the solution, then let's honestly admit that you and I are damned fools, but why blame it on the Lord and say He created something "impossible?"

If the motion picture has done nothing else it has been the greatest quickener of brain action that we have ever had. It has stirred up sluggish brain cells as all of the printing presses in the world could not do. It is easy enough to understand why, and yet this angle has probably never occurred to most of us. The motion picture has a definite physical impression to present to the eye, but it is an impression so swift that in order to register and apply it properly brain cells that had not been used to hurried exercise had to learn to function far beyond any limits to which they had been accustomed. The automobile got us used to physical speed. It was the motion picture that got us used to mental speed.

No sooner does a man bring out a brilliant and practical idea, but some ignoramus must interfere and try to show some reason why the scheme is impractical.

Even if you gave much time and labor to learning the hundreds of wrong ways of doing a thing, it might lead in the end to the right way.

The best thinking has been done in solitude. The worst has been done in turmoil.

The three great essentials to achieve anything worth-while are, first, hard work; second, stick-to-itiveness; third, common sense.

Genius is one per cent inspiration and ninety-nine per cent perspiration.

Most young people leave their schools only partially educated, and rapidly forget a large part even of that which they have been taught. I cannot believe that if they had been taught the right things in the right way this would be the case so frequently and notably. They fail to learn because the methods of teaching are wrong. They forget because the methods of instruction have made them actually dislike knowledge. Learning is not made interesting and most young people will not acquire information which seems to be uninteresting. Interest and simplicity should be the keynotes of all education, I believe. It is impossible to fascinate young minds with dull textbooks.

We shall have no better conditions in the future if we are satisfied with all those which we have at present.

What is a college? An institute of learning. What is a business? An institute of learning. Life, itself, is an institute of learning.

When I want to discover something, I begin by reading up everything that has been done along that line in the past—that's what all these books in the library are for. I see what has been accomplished at great labor and expense in the past. I gather the data of many thousands of experiments as a starting point, and then I make thousands more.

I never did anything worth doing by accident; nor did any of my inventions come by accident—they came by work.

Every child should be encouraged to develop his faculties by making things, and by observing nature for himself, instead of having his mind crammed with memorized facts. I like the Montessori method. It teaches through play. It makes learning a pleasure. It follows the natural instincts of the human being. The present system casts the brain into a mold. It does not encourage original thought or reasoning—the seeing of things in the making is what counts.

We are all happier when we look ahead with confidence. The world wants confidence.

My message to you is: be courageous! I have lived a long time. I have seen history repeat itself again and again. I have seen many depressions in business. Always, America has come out stronger and more prosperous. Be as brave as your fathers before you. Have faith! Go forward.

# The *Encyclopædia Britannica Films* collaborators:

## a distinguished faculty

Teachers who use EB films and filmstrips bring into their classrooms through these materials a company of distinguished scholars—a faculty of talent and scholarly wisdom equal to that in any university in the world. These are the men and women who serve as the collaborators, the guides and advisers on the production of EB films and filmstrips. Teachers who are using the physics and chemistry courses on film or the humanities series enjoy the close association in their daily classroom work of a group of outstanding master teachers in science and literature. But these are only a few of the more than 600 scholars whose rich store of knowledge and achievements in research have gone into the creation of EB films and filmstrips.

Every EB production is designed with the inspiration and guidance of a top flight specialist in a field of knowledge. Most have done outstanding work in university teaching and research in the physical or behavioral sciences, medicine, law, and literature. Among them are seven presidents of universities and colleges and at least seven deans of colleges and departments. There are a dozen curators of internationally known museums. There are also leaders in the field of education, outstanding teachers, and writers and journalists of national reputation. There are winners of great honors including the Nobel Prize and the Pulitzer Prize. There are noted scholars from almost every one of the nation's leading institutions of higher learning and from every part of the country.

The great contributions now being made to teaching through films by such men as John Baxter in chemistry and Harvey White in physics are actually carrying on a principle that has guided EBF from its beginning—to make the wisdom and teaching talent of eminent scholars available to every classroom in the nation. This was begun years ago with the production of the great classic motion pictures that were prepared under the guidance of A. J. Carlson of the University of Chicago and his colleagues in science and Wallace Atwood, O. E. Baker, and Howard Odum in the social studies. Today the roster of the EBF faculty carries a host of scholars of equal excellence. Here are a few whose teaching and research achievements have contributed to the creation of EB films and filmstrips:

### In the physical sciences:

Professor Willard F. Libby, Chemistry Department, University of California, a prominent member of the Atomic Energy Commission and formerly at the University of Chicago.

Professor George Wells Beadle, Nobel Prize winner, Chairman of the Division of Biology, California Institute of Technology (Professor Beadle is one of the advisers on EBF's now developing high school biology program and is featured in the newly released film DNA: MOLECULE OF HEREDITY).

Dr. Fred L. Whipple, internationally known astronomer, Staff Member of Harvard College Observatory and Professor.

Professor George Gamow, University of Colorado, author of such popular works in atomic physics as *Atomic Energy in Cosmic and Human Life, One, Two, Three... Infinity, Creation of the Universe, Mr. Tompkins Learns the Facts of Life, The Moon.*

Dr. Ralph W. Gerard, University of Michigan, distinguished specialist in the physiology of the brain, former associate of Professor Carlson, collaborator on EBF's classic biology series, and now serving as adviser on the new biology program.

Dr. John T. Rettaliata, President, Illinois Institute of Technology.

Dr. F. W. Schlesinger, Director of the Adler Planetarium.

Dr. Carey Croneis, widely known geologist who is Provost of Rice Institute.

Dr. Charles Palm, Dean and Director of Research, New York State College of Agriculture and Home Economics, Cornell University.

Dr. E. Laurence Palmer, Emeritus Professor, Cornell University, and Director Nature Education, Nature Magazine.

Professor Herluf H. Strandskov, Department of Zoology, University of Chicago.

Willy Ley, prominent and internationally known specialist in space science.

### In the social sciences:

Professor Henry S. Commager, History Department, Columbia University, one of the nation's foremost American historians.

Professor Arthur M. Schlesinger, Jr., Pulitzer Prize winner, Department of History, Harvard University, a distinguished American historian and writer on politics.

Professor Allan Nevins, twice a Pulitzer Prize winner, Department of History, Columbia University, one of the best known American historians and author of numerous popular books.

Professor Harold D. Lasswell, School of Law, Yale University, political scientist of national reputation.

Professor Peter H. Odegard, Department of Political Science, University of California, pre-eminent for his research and writing on the political system.

Dr. Edward S. Corwin, Emeritus Professor, Department of Political Science, Princeton University, the nation's foremost scholar on the American Constitution.

Professor Preston James, Department of Geography, Syracuse University, one of the world's leading experts on the geography of Latin America.

Professor Harold S. Kemp, Department of Geography, Harvard University, noted specialist on the geography of western Europe.

Professor Clyde Kluckhohn, Department of Anthropology and Chairman, Harvard University.

Professor Hans Kohn, Department of History, City College of New York, world's outstanding student of the history of nationalism.

Professor Hallam L. Movius, Jr., Department of Anthropology, Harvard University, one of the nation's most distinguished specialists in the archaeology of the Neolithic Period.

Dr. Arnold Gesell, Research Consultant to the Gesell Institute of Child Development, previously Professor, Yale University Medical School, leading experimentalist in child psychology.

Bruce Catton, Pulitzer Prize winner and author of a number of distinguished books on the history of the Civil War.

### In literature and letters:

Theodore Morrison, Lecturer in English, Harvard University, author of the most recent popular translation of Chaucer.

Carl Van Doren, noted poet, author and critic.

Levi Fox, Director of Shakespearean Birthplace Trust, Stratford on the Avon, United Kingdom.

### In education:

Dr. William S. Gray, Director of Research in Reading and Emeritus Professor, Department of Education, University of Chicago, noted authority in reading and language arts.

Professor Paul Hanna, Department of Education, University of California, noted specialist in elementary social studies and author of numerous textbook series.

Dr. Samuel R. Powers, Emeritus Professor, Teachers College, Columbia University, authority in the teaching of science.

Dr. Arthur I. Gates, Emeritus Professor, Teachers College, Columbia University.

Professor Ernest Horn, College of Education, State University of Iowa.

EB FILMS

The Editors of WISDOM feel a profound sense of gratitude to those organizations and individuals whose cooperation has made possible the excellent photographs in this Special Edition. They regret that limitations of space make it necessary to confine acknowledgements as follows: front cover, Ford Motor Company; back cover, National Park Service. Also, Encyclopaedia Britannica Films, Eastman Kodak Company, Ford Motor Company, MGM Research Department, Edison Laboratory National Monument Museum. All other photographs copyrighted by WISDOM.

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